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WOOD'S MEDICAL AND SURGICAL MONOGRAPHS



INFLUENZA ASSOCIATED WITH NERVOUS AND
MENTAL DISEASES

BY DR. VAN DEVENTER

TECHNIC OF LING'S SYSTEM OF MANUAL
TREATMENT AS APPLICABLE TO SURGERY
AND MEDICINE

BY ARVID KELLGREN, M.D.

ANTIPIRESIS

BY PROF. DR. ARNALDO CANTANI

SOME URINARY DISORDERS CONNECTED
WITH THE BLADDER, PROSTATE, AND
URETHRA

BY REGINALD HARRISON, F.R.C.S.

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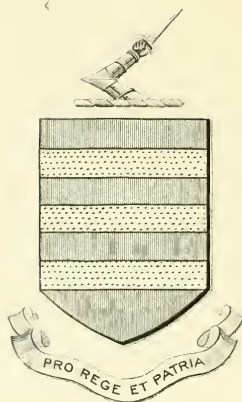
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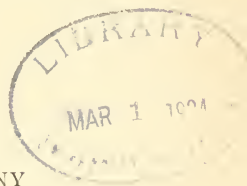
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INFLUENZA

ASSOCIATED WITH

Nervous and Mental Diseases.

BY

DR. VAN DEVENTER.

INFLUENZA ASSOCIATED WITH NERVOUS AND MENTAL DISEASES.

IN the second half of December, 1889, and in January, 1890, a large number of patients in the wards for nervous diseases at the Buiten Hospital in Amsterdam were attacked by influenza.

In the majority of the cases no specially bad effect on the course of the disease was observed, with the exception of the three following cases.

In the first case death occurred, six days after the onset of the influenza, in a man *æt.* 50 years, who had suffered for a year and a half from hemiplegia after cerebral apoplexy, although no grave symptoms had been previously noticed, apart from irregular action of the heart.

In the second case a man *æt.* 36 years, who had suffered for seven years from the demented form of paralysis, died two weeks after a trifling attack of influenza, although there had been no precedent serious symptoms. This was also true of a woman *æt.* 41 years; she had complained for ten years of painful sensations in the head, evidently as the result of unhappy home life and bad treatment on the part of her husband, who, while drunk, had often struck her on the head. Three years ago she was greatly frightened by a lunatic who pursued her with a knife. After this the hypochondriacal form of dementia paralytica developed. On January 4th an attack of influenza developed, and subsided on January 8th without leaving any visible traces. On January 15th a relapse occurred with moderate swelling of the tonsils; violent maniacal attacks developed, but could be repressed by the administration of pieces of ice. Three days later death occurred after the development of bed-sores. On the other hand, a favorable influence was observed in the case of an hysterical girl of 9

years. This child suffered from brain disease since the first year of life, and during the last year, after a fall upon the occiput, had attacks of confusion, associated occasionally with unconsciousness. After a slight attack of influenza, these symptoms were no longer manifested, and the patient felt entirely well.

In a large number of nervous cases the influenza ran an entirely latent course, both as regards the patient and those around him.

A few cases were improperly called influenza psychoses; for example, a woman who was in the maniacal stage of dementia paralytica and in whom indisputable signs of this disease had already been noticed. In only one case of influenza, which ran its course without further complication, was delirium very prominent. This was in a man of 37 years who remained in bed only on the first day of the disease, although he felt weak on the following days. At the end of the week he again took to bed, three days later began to be delirious, and exclaimed constantly that he was falling down, that he lay in the water, etc. After he had threatened his daughter with a knife he was admitted to the Buiten Hospital. Four days later he became conscious, recognized his condition and surroundings, but denied that he had been delirious. In this case alcoholism may be excluded, as is also true of the following cases of influenza-pneumonia with delirium, at least in the first two.

In a man of 47 years, without neuropathic taint, violent delirium began three days after the development of influenza-pneumonia. The patient was extremely restless, wanted to leave the bed, and thought his money was being stolen by imaginary persons standing around his bed. On being addressed in a loud tone of voice he realized his condition for a moment. Hallucinations could not be discovered. Death occurred seventeen days after the onset of the disease, after the patient had grown weaker and the heart's action more irregular.

A woman of 21 years, with influenza-pneumonia and left pyothorax, was delirious, imagined that she flew to heaven with the rapidity of an arrow and then fell down with equal rapidity, that she became smaller and larger, and that the bed clothing was as heavy as lead and again as light as a feather.

A man of 28 years, whose father and grandfather had been drunkards and had committed suicide, but who himself had lived very temperately, especially in the last few years, was suddenly attacked by a violent influenza-pneumonia, associated with delirium. He was exceedingly frightened, said that he was in hell, and that people were annoying and torturing him; he saw animals, men, and large spectacles, wanted to drown himself or jump from the window, and often left the bed to beat his mother, whom he regarded as one of his tormentors. A week after the beginning of the disease the patient was admitted to the hospital with double pneumonia and violent fever. He was conscious of his condition and surroundings, stated that he had suffered from severe stitches in the back, and that "he then became confused but had not been delirious." Toward night he again became restless and anxious, saw snakes around his bed; a few hours later he fell asleep and on awaking was entirely conscious. Since that time no mental abnormalities were detected, the temperature became normal two days after admission, and the course of the disease was undisturbed.

A man of 50 years who had received a sabre wound on the head fifteen years before; rarely drank liquor to excess, but on account of tremor usually took whiskey in the morning on an empty stomach. The influenza-pneumonia began with herpes; the patient complained that "his head is turning around and everything is topsy-turvy." During the first four days the patient was very restless and confused, entertained the delusion that he had been robbed, that he was being mocked, and wanted to drown himself. At the end of that time his mental condition became normal, although there had been no critical sleep, but the patient denied that he had been delirious and gave wrong accounts of the course of the disease. The temperature did not become normal until two weeks later, and then the restoration to health was soon complete.

Alcoholism plays a great part in the cases of so-called influenza-psychoses. As is evident from the following cases, the disease may be the cause of alcoholic excesses, and, on the other hand, previous abuse of alcohol, whether acute or chronic, may exert an influence on the course of the disease.

In a man of 45 years who had suffered from delirium tremens three years before, but had since lived temperately,

an attack of influenza developed, associated with "delirium and voices in the head," as the patient expressed himself. He felt weak but kept himself on his legs by the aid of drink, was constantly drunk, quarrelled with his wife, and was often violent. In order to free himself from this condition, he requested admission to the hospital twenty-six days after the beginning of the disease. He was extremely weak and depressed, but soon felt restored, and was discharged cured at the end of two weeks.

A patient of 40 years with a neuropathic taint, of a violent and passionate character and addicted to drink, fell from a considerable height a year and a half ago, and remained unconscious for six hours. Since that time he complains of various sensations and a feeling of confusion, especially after drinking. Four months ago he was in the Buiten Hospital for three weeks, was very drunk at the time of admission, and exhibited the characteristic symptoms of acute hallucinatory delirium. Soon after admission he fell asleep, and then had an attack of delirium tremens which lasted a week. After his discharge the patient is said to have lived very temperately. At the end of December he felt "sore and lame," and drank four or five glasses of liquor; this was followed by alcoholic furor, and the patient, firmly bound, was brought to the Buiten Hospital. During the maniacal attack, which lasted about six hours, he cursed and raved against his wife; he then fell into a sleep, and on the following morning remembered nothing that had happened on the previous day after taking the alcoholic drinks. On admission the patient seemed to be suffering from influenza; this was shown by the subsequent course, and in two weeks he was discharged cured.

A patient of 50 years, "who could stand six glasses very well," was brought into the hospital because he was so confused. He was evidently drunk, although on the day of admission he had taken only two glasses. On closer examination he also appeared to be suffering from influenza. He was discharged cured at the end of nine days.

In the following cases delirium tremens appeared during the course of influenza:

A brewer, æt. 30 years, who was in the habit of drinking six to seven quarts of beer daily, but no hard liquor, had taken "seven to eight swallows of vegetable bitters" daily on ac-

count of anorexia and tremor. Two days after the onset of influenza he became delirious, but remained at work until the next day. On account of great agitation he was then brought to the Buiten Hospital. He said that two of his comrades were disputing concerning the payment of the last round of drinks and that he was compelled to pay the bill. He also maintained that fifty comrades were playing the flute around him and were pushing him into the air by means of a long cane which they pushed beneath the mattress through a small opening in the wall. On the fourth day of the disease a critical sleep set in, after which the patient again "felt clear in his head." During the following week he still complained of confusion and dreamed at night about his work.

In a hard drinker *æt.* 34 years the influenza began with delirium tremens, associated with maniacal attacks, during which it was necessary to isolate the patient. On the third day he slept about three hours; on the fourth day he slept the entire night and awoke feeling, according to his expression, sound and well. He remembered everything, and stated that he had dreamed that he was compelled to build the Eiffel Tower in twenty-four hours, that he was unable to do this because his comrades prevented him, and that he had been violent for this reason.

A cooper, *æt.* 36 years, who had drunk moderately during the last two years and had undergone much worry on account of his wife's illness, saw men moving about on the second day of the disease. Toward night the symptoms of delirium tremens appeared: the patient became very restless, jumped out of bed; was afraid that his brothers would poison him as they had poisoned his wife. When spoken to in a serious tone, even during the periods of greatest restlessness, he became conscious for a moment and then said: "I am not well; I am certainly crazy." Four days later he recovered after a deep sleep.

A hard drinker, *æt.* 40 years, who had suffered from 1883 to 1885 from convulsive attacks attended with unconsciousness, mistook, after the development of influenza, pieces of turf for kittens. On the following day he began to pack his goods because there were thieves in the house, continued this operation during the night, and finally called the police. When brought to the Buiten Hospital he showed the typical

signs of delirium tremens, and defended himself against all sorts of thieves and animals, until he fell into a deep sleep on the tenth day from the beginning of the disease. Upon awaking he felt well with the exception of "headache and a lame, tired feeling in the legs." He remembered nothing of his disease with the exception of the first day.

A saloon keeper, æt. 40 years, with a strong neuropathic taint and evidently addicted to drink, manifested the ambulatory form of delirium tremens from the fourth day of the disease until his admission to the hospital. He still served his customers, had the delusion that disguised policemen were spying upon him, and maltreated his wife several times. Upon admission he saw all kinds of animals and was constantly busy, as if serving his customers. On the following morning, after a deep sleep, he felt perfectly well and remembered all the events of the last few days.

A hard drinker, æt. 35 years, with a marked neuropathic heredity, who had had no opportunity to obtain liquor in the last six months, received from his comrades "a stiff horn" because he felt "lame and miserable." On the following day, after he had slept off his debauch, he appeared to suffer from influenza, and also saw rats, men, mountains, and policemen who pursued him with sabres. He knew that these were hallucinations because he had previously suffered from a similar attack. In dread of what might happen, he sought admission to the hospital. As soon as he closed his eyes or sat in the dark the hallucinations appeared; toward night he became frightened. On the third day of the disease he showed all the symptoms of delirium tremens. On the twelfth day, critical sleep, followed by recovery.

In a man of 46 years, with marked neuropathic taint, who could stand very little alcohol and who had been drunk occasionally during the last six months after financial losses, visual hallucinations appeared two days after the beginning of influenza. He saw a man in the garden with a pipe in his mouth, black dogs and cats, monkeys, etc. He attended to business, but during the next few days was very restless and dangerous to those around him. He maintained that his son wanted to kill him, attempted to leave the house, struck those around him, and cried murder. He also spoke of an electrical ship in which he could reach America in three days, and

ordered his horse to carry him to the vessel. The patient was admitted to the hospital on the twenty-eighth day of the disease. When left to himself all the signs of delirium tremens appeared; when spoken to he cried "Murder! help!" in the delusion that his son and brother-in-law were killing him. Two weeks after admission the patient became more quiet and two weeks later was discharged cured.

In the three following cases a fatal termination ensued:

A hard drinker, *æt.* 46 years, with no hereditary taint, suffered six years before from pleuro-pneumonia and two years before from erysipelas; in both cases an epileptic attack occurred two days after the beginning of the disease and was followed by delirium tremens. On the last day of December influenza developed, and on the following day the patient had two epileptic attacks and delirium tremens. He was extremely restless, a prey to terrifying hallucinations, and in an almost constant condition of furor; the heart's action was very irregular. Death occurred January 5th after constantly increasing weakness of the heart.

A saloon keeper of 39 years died under similar circumstances four days after the onset of an influenza-pneumonia. After the second day of the disease the patient believed that the police were hunting for him on account of some unknown crime: at the same time he was constantly busy, as he expressed it, "in serving his guests."

A hard drinker, *æt.* 54 years, with diffuse nephritis, suffered from delirium tremens after the first day of an influenza-pneumonia; it lasted about two weeks. He threw everything that came into his hands at his imaginary persecutors. In the next few days he was delirious at night, but no psychical abnormalities were noticed during the day. He died six weeks from the beginning of the disease, evidently as the result of the renal affection.

In all these cases hallucinations of the different senses could be produced with ease, and the patient was very dangerous to those around him, at least at the height of the disease.

Symptoms of hysteria were also observed with the occurrence of influenza. The first case was seen in a nervous boy of four years with neuropathic heredity. Repeated hysterical attacks occurred for two weeks after the onset of influenza.

A boy, *æt.* 10 years, who had suffered formerly from chorea,

began to go out on the fifth day after the beginning of the influenza, although he still coughed constantly and complained of pains in the head and legs. Four days later he complained suddenly of a dull noise and pain in the head, became pale, fell over backward, became unconscious, and tonic and clonic convulsions developed throughout the body. Next the patient turned several times around his own axis, protruded the tongue as far as possible, then folded his hands upon the chest, opened his eyes and said, "I am feeling better." Such attacks occurred several times during the first two weeks. After the seizures the patient was very sensitive to impressions on the special senses; he was irritable and violent. A week later choreiform movements appeared, especially on stretching out the hand.

A patient, æt. 39 years, of feeble constitution, and who, when overworked, exhibited symptoms of hysteria during the last few years, suffered on the third day after the onset of influenza from a complete hysterical aura accompanied by vertigo and roaring in the head. These attacks occurred three times on this day, twice a day on the next two days, and then no further symptoms were noticed.

A nervous girl, æt. 13 years, with an hereditary predisposition, stated, without reason, at the beginning of the influenza that she had swallowed two needles. The tonsils were much swollen. In the first few days mild hysterical attacks occurred, terminating in laughing or crying. They could be checked at once by pressing upon any part of the body and saying at the same time that the attack should cease. Mild choreiform movements were also present in this case, but they disappeared very quickly.

A woman, æt. 28 years, who had suffered from "attacks" for the last four years as the result of a violent fright, passed through an attack of influenza in the Buiten Hospital without any noticeable sequelæ. Three weeks later there was a relapse, followed in two days by a violent hysterical seizure (for the first time in six months), attended with biting of the pillow, rotation around her own axis, and jumping into the air. Such attacks occurred repeatedly during the first three days.

An hysterical and neurasthenic patient, æt. 40 years, became very quarrelsome during the latent course of influenza,

argued constantly, and maintained falsely that one of the other patients had given her a blow in the back. A week later she was again quiet, and stated that during her influenza her entire system had been in confusion, and that for this reason alone had she been so disagreeable.

Under the influence of influenza an hysterical woman of 56 years began to rave and scream violently and to find fault with everything and everybody. As an excuse the patient, who did not know that she was suffering from influenza, said that "her nerves had gotten the upper hand." At the end of two weeks the symptoms gradually subsided and have not reappeared since.

An especially noteworthy phenomenon is the influence excited by influenza upon the occurrence of epileptic attacks.

A patient, æt. 23 years, had suffered from earliest childhood, until three years ago, from attacks of mental confusion, during which he undressed himself and ran about as if looking for something. After an epileptic seizure in the street he was admitted to the hospital, where he was attacked by influenza, associated with extensive urticaria, including the face. He had felt sick the day before, and then had a similar epileptic attack which he did not remember. A week later he felt entirely well.

A patient, æt. 36 years, with slight asymmetry of the face, had occasional epileptic vertigo, and for the last three months after carrying a heavy load on the head suffered from headache. In the morning, before going to work, he had a violent epileptic fit. Consciousness was restored six hours later, and he then appeared to be suffering from influenza, associated with *tic douloureux*. He did not remember that he had had an attack or what had happened in the last few hours. On the following day he was perfectly conscious, and stated that on the previous day he had been in constant fear that the house would tumble down.

In a drunkard, æt. 41 years, the influenza also began with an epileptic attack, which was soon followed by a second one.

A strong man, æt. 40 years, after his recovery from influenza, suddenly stood still in a hall, gazed fixedly in one direction, turned around three times, and then had a violent epileptic fit.

In the two last-mentioned cases the patients are said never

to have suffered from similar attacks. In the former this seems doubtful; in the latter we have only the statements of the patient and his wife, who would be apt to conceal the existence of epilepsy.

In a woman, *æt.* 22 years, the influenza also began with a characteristic epileptic attack. She was peculiar in her ways, was irritable after exertion, and dreamed a good deal. There was no neuropathic history and the patient had never suffered from nervous attacks.

A patient, *æt.* 23 years, who had the first attack six months ago, felt tired and miserable all morning. Toward noon she suddenly fell and had a convulsion; afterward she was quite stupid and very annoying to those around during the next few days.

These cases show clearly the effect exercised by influenza upon the mood. In this respect the following cases of melancholia are extremely instructive:

A boy, *æt.* 16 years, with an hereditary predisposition, was scolded by his father a week after the onset of influenza. This hurt the boy and, as he expressed it, "stuck in his throat" so that he became confused and depressed. In his fear he constantly clutched his throat, beat himself upon the head, wanted to hang himself with a handkerchief, and cried, "I want to die." Two days later he saw men with sabres and daggers who wanted to murder him. Five days later he was admitted to the hospital, and was taken at once into a separate room. He exclaimed constantly that it was disagreeable to him to be alone, but about six hours later stated that the feeling of anxiety in the throat had left and that "he felt as cheerful now as he had been miserable before."

A woman, *æt.* 31 years, with a nervous heredity, was very unfortunate in her married life, especially because her husband was cold toward her, so that she sought consolation from a lodger in the family. On January 3d an attack of influenza developed. Since then she complained constantly of headache, tinnitus, and confusion, and said, "If this continues I will go crazy." After six sleepless nights she felt extremely weak; on the following day, January 16th, she suddenly received a letter from her lover in which he stated that he intended to return. The feeling of anxiety at once "passed to the heart," and at night she left the house in order to drown herself; she

also hung herself, but was rescued. She was a prey to the most terrible fear—said that there was no salvation for her, saw policemen who were about to arrest her, judges to sentence her, and persisted that the workmen attempted to poison her. Hereupon she confessed her infidelity to her husband, who forgave everything. January 18th she was admitted to the hospital and, like the previous patient, taken to a separate room. After a conversation with her on the following morning her fears disappeared almost at once, and she again felt entirely well, apart from a feeling of weakness.

Both these cases are typical examples of melancholia.

This is also true of the following case, in which melancholia apparently developed spontaneously on the day after the onset of influenza. The patient was 22 years old, with a neuropathic heredity, but otherwise perfectly healthy. During the first night he complained of insomnia and anxiety, so that he often arose. He then said: "I must die; I am a sinner for whom there is no grace; I have blasphemed Jesus, killed my brother and grandfather [who were long since dead], and must burn forever in hell." He was often a prey to the most violent fear and despair. He said on several occasions: "The disease is in my soul; my head, heart, and soul are full of ulcers." Four weeks after the beginning of the disease he became more quiet, but remained depressed from the delusion that he had committed a sin.

In this patient, as in the two preceding ones, there were insomnia, anorexia, constipation, coldness and cyanosis of the limbs. The following complicated case is also noteworthy in regard to the short duration of the melancholia:

A patient, æt. 43 years, with a neuropathic family history, had suffered from "absences" once or twice a year for the last twenty years; in 1888 he had an affection of the eyes, associated with general tremor and constant noises in the head. Two days after the onset of his influenza he gradually became depressed, quiet, and tired of life. Twelve days later he said he was worse than an animal and threatened to murder his family. On the following day he hung himself, but was rescued and sent to the Buiten Hospital. The patient remembered that he had been low-spirited for the past few days, but not that he had attempted suicide, and showed no further symptoms beyond those which had been present before the influenza.

In the following case the influenza was evidently merely the last straw that broke the camel's back:

A patient of 27 years, with a neuropathic predisposition, of limited intelligence, violent and obstinate, believed from earliest childhood that he had been neglected. Two days after the onset of influenza, with high fever, he began to be delirious, was frightened and depressed, and stated that a man with a sharp cane would come to beat out his brains; there were occasional violent attacks of furor. Four days later he attempted to cut his radials, found the appearance of the blood pleasing, and the bandaging of the wound caused no pain. He then jumped into the garden from a height of eight feet and was afterward taken to the hospital. During treatment he was depressed, asked everybody's pardon, and wished himself dead. He accused himself of the queerest crimes, stated that he was punished by electrical currents, dogs, lions, and tigers.

The following case may also be mentioned in this place:

A patient, æt. 57 years, who had suffered since puberty from hypochondriasis, which, as a rule, he could conceal, expressed the most varied complaints after he had been in bed three weeks with influenza. A week before his wife had died of influenza. Two days later he suddenly saw a female figure in a long black cloak, beneath which his wife was concealed. He heard her voice distinctly. On the following day the patient entered the Buiten Hospital in the hope of being reunited to his wife. In about a week this delusion subsided, but the hypochondriacal complaints only ceased after improvement in the general nutritive condition.

Of the following cases of mania only the first may be called a pure influenza-psychosis. In the second one there had been previously a violent mental emotion.

A girl of 20 years, with neuropathic heredity and of a quite irritable, obstinate character, began, two weeks after the onset of influenza, to talk constantly, to sing and speak in verse; she often shook with laughter, made faces, and imitated the movements and words of others. She said that she had a wild enjoyment, was cheerful and happy. She would play with her shadow for hours, and if interfered with often had violent attacks of anger. Seven weeks after the outbreak of the mania the patient was discharged cured.

The second case occurred in a girl of 16 years who had already had four attacks of periodical mania (each time during menstruation); the first attack had developed on the day after a man had entered her sleeping-room. A few days after the last menstrual attack a similar attack of cheerful mania developed in combination with influenza.

A man, *æt.* 49 years, with neuropathic heredity, had experienced financial losses a short time ago. Ten days after the outbreak of influenza, from which he seemed to have recovered, he suddenly began to sing and dance, and spoke incoherently, at first concerning his losses. In the first few days he opened the window to jump out and took a revolver to shoot himself. The patient said, however, that he merely wished to greet the people on the street and to conceal the revolver. He was always cheerful, constantly moving about, clapped his hands, and drummed with a cane upon the bedstead. It was only after the lapse of two months that the patient was discharged cured. Acute hallucinatory confusion was observed in one case, a woman of 65 years, who had had a puerperal psychosis forty-six years before, after the death of her first child. Otherwise she had been well, bodily and mentally, but had a violent temper. The patient had gotten up a week after the onset of influenza, but then had to return to bed, suffered from insomnia, and, three days later, began to talk very rapidly. At the end of two days she spoke incoherently, sang lullabies, rocked a package which she called her baby, and, as her family said, exhibited the same symptoms as forty-six years before. During the further course of the disease she was very restless, often raving, suffered from echolalia and various hallucinations, and was extremely confused. Her moods depended upon the various delusions and the most prominent hallucinations. She was very feeble and pale. Eighteen days after the beginning of the disease she recognized her condition, said that "she had been restless in her head, and had had bad dreams which she did not understand." Two days later she was entirely normal, and stated that a fire which she had seen in the neighborhood had existed only in her imagination.

Only one case of monomania was observed, in a patient of 31 years, with a neuropathic history on the maternal side. He had a passionate temperament, could stand very little alcohol, became boisterous over trivial matters, and "acted as if he

saw or heard something" without remembering it afterward. Visual hallucinations suddenly developed eleven days after the onset of influenza. For a few days before he had had a pale, depressed appearance. At night he became very excited and asked for the minister in order that he might receive communion. On the following day he wanted to go to church, and often jumped out of bed. Two days after the beginning of the disease he was admitted to the hospital and announced that he had read in the Gospel of Luke that "the light shines in the darkness." This refers to him who has suffered so much, and was a revelation that he and his wife would beget St. John, and that from his (the patient's) eyesight would proceed the light that would spread over the world. God had sent him the disease as a trial, but sorrow was followed by joy. The patient furnished a good clinical history, suffered from visual and auditory hallucinations, and under their influence was often restless and dangerous, because he often became suspicious of one or the other patient.

It is evident from the foregoing cases that the favorable or unfavorable influence which is said to be exercised by influenza upon an existing nervous disease is more apparent than real. Experience teaches that such a favorable or unfavorable termination may be observed without this causal factor. In non-complicated cases delirium was prominent in extremely rare instances, despite the large number of influenza patients who were treated in the Buiten Hospital.

The experience gained in this hospital does not justify us in speaking of an encephalic form of influenza. Delirium is observed not infrequently in pneumonia, while acute symptoms of chronic alcoholism occur in the most varied diseases. A notable feature is the frequency of epilepsy and, to a less extent, of hysteria which were observed in connection with influenza, and in cases in which previous nervous seizures could be positively excluded. But even in such cases a few characteristic symptoms point to a predisposition. A similar predisposition must also be assumed very probably in the foregoing cases of mental disturbance.

We have intentionally excluded those cases in which no direct connection could be demonstrated between the influenza and the subsequent insanity.

The writer has treated a number of patients who stated

only after direct question that they had suffered from an attack of influenza and even a relapse, and complained since then of weakness, general malaise, mental weakness, irritability, anxiety, and insomnia.

In these cases, also, the prognosis seems to be favorable when the patient is brought into better surroundings, his nutrition improved, and no other etiological factors come into play. The unfavorable course of many cases seems to be due to the original bad surroundings. When these can be corrected a favorable prognosis may also be given in cases of chronic alcoholism. In uncomplicated cases the course of the disease is very acute. In a case which was not reported here an attack of transitory melancholia lasted only eight hours and ended in a quiet sleep, from which the patient awoke "as usual." The good result was obtained by complete psychical and bodily rest and cheering admonitions.

A large number of the reported cases show the necessity of having in every hospital a ward for patients suffering from acute psychoses. Admission to a lunatic asylum is not desirable, both on account of the short duration of the disease and the bad effects of the transportation, inasmuch as the heart's action is irregular and insufficient in many instances.

TECHNIC OF LING'S SYSTEM
OF
MANUAL TREATMENT

AS
APPLICABLE TO SURGERY AND MEDICINE.

BY
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TECHNIC OF LING'S SYSTEM OF MANUAL TREATMENT.

CHAPTER I.

INTRODUCTION.

THE following pages are intended to serve as a guide to the student, and to set more clearly before the minds of readers the curative uses to which Ling's system of manual treatment may be applied. They mainly consist of sixteen demonstrations which were given by me at Pola during the winter of 1888-89. These lectures were delivered at the request of the surgeons of the Imperial and Royal Austro-Hungarian Navy, and also of the surgeons of the land forces stationed at Pola. Numerous illustrations have been added, in order to render more clear the directions in the text; and it is hoped that the work may prove not only of interest, but of practical utility, in the study of this form of medical treatment.

It is now more than eighty years since the idea of curing diseases by well-regulated movements first occurred to the Swede, Peter Henrik Ling.

P. He. Ling was born in the year 1776. His father was a Protestant minister. He went through the usual course of training preparatory to entering the university, where, in accordance with his parents' desire, he took up the study of divinity. The tendency of Ling's character, however, disposed him to a more active life, and as soon as he was free to follow his own inclinations, he started travelling on the Continent.

Very little is known about him during his wanderings. Certain it is that he returned home well versed in foreign languages, and a perfect master of the art of fencing; but also, in consequence of the hardships he had undergone, with a

shattered constitution. This, however, did not prevent him from following his favorite pursuits, and we thus find him at the beginning of the century working hard at gymnastics and fencing.

Ling gradually regained his health, and on his appointment, in 1804, to the post of fencing master at the University of Lund, he was a strong and wiry man. He rightly attributed the change to the gymnastic exercises he had taken; and he further drew the conclusion that what had been good for him would also be good for others, and that it ought to be possible to devise movements which would be particularly beneficial for invalids.

He was a man of indomitable energy, the whole of which he brought to bear on the carrying out of these plans. The professors of medicine at the University of Lund were friends of his, and he endeavored to interest them in his ideas, and succeeded to a certain extent in so doing. They opened their anatomy and other lecture-rooms to him, and helped him in many ways. The "fencing master," as some of the continental writers on massage, the majority of whom know nothing whatever of his treatment, are so fond of calling him, learned everything that could in those days be learned in the different departments of medical study.

By utilizing and developing many of the gymnastic movements practised by former men, and by devising for himself many new ones, he built up a system of exercises—the Ling system. He studied their effect, and endeavored to explain it on physiological grounds. As we cannot always explain the action of many drugs, so he was unable to explain why certain exercises produced corresponding results. He was in these cases guided by the law of the beautiful, and reasoned that any exercise or movement which in itself was graceful, would also be beneficial.

He divided his system into four chief branches:

1. The pedagogic.
2. The medical.
3. The military.
4. The æsthetic.

I only intend in this thesis to deal more particularly with the second group, but I may say that the "pedagogic" exercises are for the developing and strengthening of healthy

people, while the "medical" are meant to arrest or combat diseased conditions.

These two, however, pass so gradually into one another that no distinct line can be drawn between them; and it is therefore essential to know both, in order to be able to use the medical part of the system properly for the purpose assigned to it.

Being anxious to found a gymnastic institution, Ling applied for help to the government, but the Minister of State to whom he addressed himself replied, "We have enough of jugglers and dancers on wires without also subsidizing them by the state." But in the year 1812 his efforts were crowned with success, and the government of Sweden founded "The Royal Central Gymnastic Institution" in Stockholm, with Ling as its chief.

Here regular courses of lectures on anatomy and physiology were given, the pedagogic and medical gymnastics taught, together with fencing in all its branches. No pupil was allowed to enter the institution who had not passed the university entrance examination, which corresponds to the "Abiturienten Examen" in Germany. At the present time a nine-months' course of instruction is given each year, viz., from the 1st September to the 15th of May.

When Ling died, on the 3d of May, 1839, he left to his country, that numbers him among her greatest sons, in the form of his system of exercises, a legacy by which thousands have regained their health, and by which, thanks to the pedagogic portion, there still lives in Sweden a strong and healthy people.

The path, however, of this new method was not a smooth one, for so soon as the effect of the treatment began to show itself, the Swedish medical profession did everything in their power to prevent its further progress. At first they tried to kill the system by silence or assailed it with sarcasm, but finding these means useless, in the face of cures resulting from its application, they began an active resistance.

Those, however, who advocated the system—and among them, proving exceptions to the general rule, were several medical men—were by far too enthusiastic in favor of the treatment to be easily frightened from what they considered the right path.

When I spent the years 1877-79 in the institution, only a two-years' course was necessary in order to obtain a diploma, but in the year 1888 the rule was made that a three-years' course should be imperative. The concluding year is entirely devoted to attendance at lectures on diseases, to clinics, and to the application of the various movements to the patients undergoing treatment. The latter are of two classes—those in the morning being paying patients, while in the afternoon the poor are gratuitously treated. This valuable and necessary extension of time is due to the present chief of the institution, Professor L. M. Torngren, Professor Hartelius, and the other masters, who for over six years have strenuously advocated the acceptance of this rule by the Swedish Medical Council.

It is supposed by many that what nowadays goes under the name of massage is one thing and Ling's system is another. This is an entire mistake, for the massage manipulations are only a few of the passive movements contained in Ling's system. That this is the case, any one may see for himself, if he will read what Ling and his immediate successors have written. It is, on the other hand, quite true that the medical profession in Sweden, disregarding their own native institution, have "gone over the river to fetch water," and have learnt the massage movement from Metzger or his pupils.

I should also wish to state that I have not studied any part of the treatment under any one but my own masters in the Royal Central Institution at Stockholm, and my brother, Mr. Henrik Kellgren, under whom I worked more or less during the years 1876 to 1886. Neither have I read all the writings on massage and Ling's system ("Schwedische Heilgymnastik") which are everywhere cropping up on the Continent. But the little of these authors that I have read, and the figures I have seen in their books purporting to be true illustrations of Ling's exercises, are in most cases incorrect.

Another impression derived from these books is, that the authors, if they have ever been in Stockholm, must have been there during the summer, when the institution is closed, or at any rate have stayed there too short a time to learn anything.

Let me also state, that part of what I describe—*i.e.*, most of the shakings, nearly all the vibrations and the nerve vibra-

tions—are not part of Ling's original system, but have been added by my brother, Mr. Henrik Kellgren, who was a pupil under Ling junior.

It is hardly necessary to add, that we who advocate Ling's system such as he taught it, do not use any machines for producing the movements. We certainly have apparatus, if I may so call it, on or beside which the patient may take up certain positions which enable us to give the exercises where we wish, and as we wish. Machines cannot possibly do the work of the human hand, which has the brain controlling it. If the machine could feel and think, it might be otherwise. The condition of the patient varies from day to day, and so must the treatment. This can be readily done when we use our hands, but not when machines are employed. Professor Branting, the greatest of all the pupils of Ling senior, speaking of the machines, said, "De representera hedendomen i gymnastiken"—"they represent the heathen times of the treatment." I readily admit it is more comfortable to do the work with the machines, but as the patient should be our first consideration, I have no hesitation in saying that no machines will produce results comparable with manual exercises properly applied.

It is generally considered that the manual treatment is quiet inapplicable for acute inflammation of the joints and other parts. This commonly entertained belief is a complete mistake. Certainly, if we rely only on the ordinary massage movements in these acute conditions, we can do little good, and probably will do harm; but in vibrations and nerve frictions, we possess a strong weapon with which to combat these acute diseases. The difficulty lies in the application of these vibrations, for if they are given with an unskilled hand, the effect is frequently not beneficial; but this fact can scarcely be quoted as an argument against their use, or the treatment itself. Among the cases which I append, it will be found that I mention examples of acute inflammation, such as diphtheria, tonsillitis, parotitis, recent fractures, etc., which were treated at once.

In giving the massage manipulations, I never use oil or ointment of any kind. The dry massage is cleaner, it affords a better and more certain feeling to the hand, the movements are steadier, and it is seldom necessary to expose the patient's

body, except occasionally for purposes of examination. For example, in pétrissage of the abdomen, a linen or silk garment intervenes between the hand of the manipulator and the skin of the patient.

It should be added that mere theoretical teaching will never train any one to give the exercises properly. To gain complete mastery of the movements necessitates several years of careful work, as seen from the fact that the course at Stockholm has been extended to three years. Moreover, a special aptitude is required for the treatment, which even long experience will not create—just as one man may bring to the practice of operative surgery a neatness and dexterity of handling which others may work for years without being able to acquire. The treatment, in short, is one that cannot lightly be taken up in connection with other forms of medical work, but should either be exclusively practised or left alone.

The medical part of Ling's system is divided into

I. PASSIVE MOVEMENTS.

A passive movement is one which is executed on the patient, or with a part of him, he himself being entirely at rest.

The passive movements are as follows:

1. Effleurage.
2. Pétrissage.
3. Tapotement.
4. Massage à friction.
5. Rolling and shaking of the muscles.
6. Shakings.
7. Vibrations.
8. Nerve vibrations.
9. Passive extension of muscles.
10. Other passive movements, such as rolling, extension and flexion, etc., at the different joints.

II. ACTIVE MOVEMENTS.

A movement is called active when the patient himself takes a working part in it.

The active movements are divided into—

1. Free, *i.e.*, movements executed by the patient without any external help whatever.

2. Bound, *i.e.*, movements made either while steadiness and isolation are secured by apparatus, or under resistance.

Those made under resistance are again subdivided into—

(*a*) Those in which the patient resists.

(*β*) Those in which the operator resists.

CHAPTER II.

PASSIVE MOVEMENTS.

THROUGH the passive movements we act more or less directly on the part or organ which is to be subjected to treatment. Acting more particularly on the venous and lymphatic circulation, they must all be made in the direction of those currents. They all have a common physiological effect, viz., of causing resorption.

Some of the passive exercises which are executed with a part of the patient's body, approach in their character the active movements—as, for instance, the rolling of a limb, such as the arm, when we quickly rotate it at the shoulder-joint.

EFFLEURAGE.

Effleurage is a stroking movement in the direction of the heart, the object being to act more particularly on the venous and lymphatic circulation in superficial parts, such as the skin, subcutaneous tissues, etc.

The effleurage may be very superficial or deep—in other words, the pressure may vary from the lightest touch to one of considerable force; but this force must be gradually increasing as it passes toward freer and healthier parts, and should not be applied with vigor from the outset.

The superficial form of effleurage is intended to soothe pain by its action on the endings of the sensory nerves in the skin, while the deeper has for its purpose the onward passage of fluids. In any case, both forms must, according to my opinion, be made slowly. If the hand is passed quickly over the skin, heat and redness of the surface are caused. The operator has thus produced hyperæmia of the skin, *i.e.*, drawn the blood to the distal side say of an effusion—and that is

certainly a very questionable advantage. Besides, in the deep effleurage it gives the patient more pain.

If the effleurage is only superficial, one ought to begin at the extremity of the limb; when it is deep, however, a commencement should be made somewhat higher than the upper border of the swelling.

Take, for instance, effleurage of the right forearm when effusions are present (Fig. 1).

The patient rests his arm on a table, and the operator steadies it still more by grasping the wrist with his left hand. He then, with the radial border of his right hand forward, makes a stroking movement from below upward, beginning at

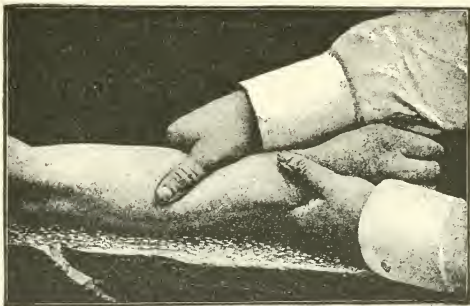


FIG. 1.

first above the effusion and gradually coming down, allowing each individual stroke to have its normal direction.

The effleurage ought to begin higher up than the exudation extends, in order to stimulate the tissues above to brisker activity, and it must be carried step by step downward, because the amount of exudation which is driven forward is of course far less than it would be if one started at the extremity of the limb. The consequence of this, again, is, that more force can be used, less pain is caused to the patient, and the resorption is quicker.

The operator should be careful to hold his own arm as nearly as possible parallel to that of the patient. The manipulation is thus easier to give, and is less hard, as every bending in the wrist-joint causes more stiffness in it, greater pressure

on the part worked on, and also changes the direction of the force.

The part of the hand with which to work depends on the portion of the body to be acted on, and the cause. For instance, round the ankle, or for thickening of a tendon, the first phalanx of the thumb or the fingers is used, but not in such a pointed manner as is generally shown in diagrams.

For my own part, I never give effleurage first, but invariably precede it with some other movement, such, for example, as pétrissage. Most operators, on the contrary, usually begin with it. There are, I understand, even those who, as a preparation, for several days limit their treatment to this movement alone, and that only round the affected part, if it be painful, as in a distortion. That is to say, the exudation is allowed to settle, and the pain caused by it at the beginning is not relieved. Such a procedure is simply a waste of time. I have given pétrissage and effleurage at once in fresh distortions, dislocations, fractures of the fibula, radius, and round the elbow, and I have never had the slightest reason to regret this method.

To give effleurage for neuralgic pains is a still greater error, because there are other easier and more effective manipulations suited to the cure—I mean nerve vibrations.

Whenever effleurage is given in any affection where the slightest movement produces pain, one hand must be used to steady the part. In fact, I invariably make it a rule to do this even when there is no pain. It gives me greater command over the limb, and the manipulation is more accurate.

I have seen diagrams showing effleurage of the throat. There has been, according to my judgment, one common mistake in them, viz., the leaning back of the head. The movement, I suppose, is to have its effect by the centripetal pressure produced on the vena jugularis interna. But if we look at the anatomical arrangement of the parts, we shall find that the sterno-cleido-mastoid and omohyoid muscles cross the vein, and must also produce their pressure when the head is thrown back. If anything is to be avoided it is decidedly positions which in themselves hinder the venous circulation—much more so then, when, as in the present case, they are entirely unnecessary, since the completely erect position is the correct one.

As regards the duration of effleurage, this depends on the cause of treatment. I am quite unable to offer an opinion as to how long effleurage should be given in order to lull pain alone, because I always use nerve vibrations. Under other circumstances, I prefer a few slow, strong, and deep strokes to any number of light and quick ones.

CHAPTER III.

PÉTRISSAGE.

PÉTRISSAGE is a kneading movement, by which the skin, subcutaneous tissues, and more particularly muscles, are acted upon.

The muscle, or part of it, is grasped slowly between the thumb and the other fingers, and rolled slowly between them, in very much the same manner as one rolls a pencil, the pressure sometimes increasing, sometimes diminishing, care being taken that the joints of the fingers and wrist are kept loose. A stiff wrist impedes the free motion of the fingers, and excludes the elasticity in them.

It is of importance in all forms of pétrissage, that the skin under the fingers should move with them, as the manipulation otherwise is somewhat uncertain and less effective. If we treat, for instance, such cases as erysipelas and frost-bite, and allow the fingers to move on the surface of the skin, these complaints are greatly intensified; while, when the manipulations are made correctly, the patients quickly recover. A short time ago I was called to a patient, a lady about thirty-eight years old, whose left ear had been attacked by erysipelas. She had felt somewhat feverish for a few days, and on the night preceding my call the illness had broken out. The ear was greatly swollen, the skin felt hard, tense, and infiltrated, and had an intensely red coloration; pain was present, and it increased on touch. The swelling and redness extended down on the throat for about two inches, and forward over the parotid region of the face; the lymphatic glands on the left side of the throat were enlarged. Fever and headache were also present.

Locally, I gave mostly pétrissage, in addition to some general treatment for the head and body. After two days the ear had its normal color and proportions, the skin peeled off, and the swelling on the face and neck were gone. For

some days afterward the patient had a feeling of prickling and slight heat when the face and ear were washed.

The masseur can easily know if he has broken through the rule of not working with a stiff wrist and fingers, if the skin

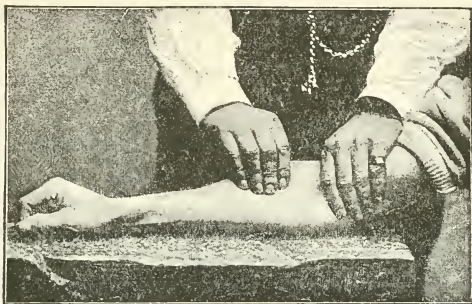


FIG. 2.

has been reddened more than from ordinary pressure, the redness of the latter being less intense, and disappearing more quickly. It seems scarcely necessary to state that the

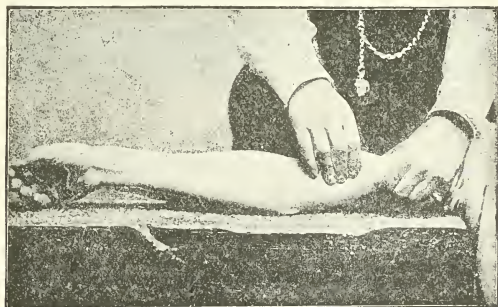


FIG. 3.

pressure should gradually increase in strength, but, as I have frequently seen mistakes of this kind made, I mention it.

The pétrissage to the muscles may be applied with one or with two hands, as shown in Figs. 2 and 3.

The manipulation with one hand hardly needs any further explanation, but with two hands it is more complicated. The muscle is rolled as before described, but it is also stretched by the backward movement of the fingers of one hand, while the thumb of the other passes forward. In Fig. 3 we also see that at the conclusion of the movement, the fingers of the hand moving forward and the thumb of the other one are only lightly in contact with the skin, and do not exert any pressure. If they did, we should have a constant pressure, less stretching of the muscle, and the stream of the fluids in the muscle would be interrupted; while, in addition, the skin would be strained in a way that would be very uncomfortable for the



FIG. 4

patient. Care must be taken that the very tips of the fingers are not used, but at least the last phalanx as a whole and the anterior part of the second one as well. The use of the tips of the fingers and the thumb has been one of the commonest faults I have met with. One cannot work with the tips without strongly bending the fingers, which has the effect of stiffening them and the wrist. The softness in the movement becomes lost, the patient strains and contracts the muscle from the pain produced (*e.g.*, in rheumatism, and even if there is no acute disorder), and the work becomes only superficial.

In giving *pétrissage* of a muscle, we ought always to begin at its proximal end, and gradually pass downward. Here, as in *effleurage*, we must take care, that each kneading has a

direction upward. This is easily produced by a slight twisting of the hand.

When effusions arising from sprains, dislocations, or fractures are treated with *pétrissage*, I work with the whole of the thumb down to its thenar part. I start above the effusion.

In order to obtain a larger and freer range of motion, the thumb is put down a little above the place to be subjected to manipulation, and carried back to the particular area to be treated. If this precaution is not taken, the skin becomes stretched and irritated by the onward movement of the thumb. The thumb describes a half circle, with gradually increasing pressure as long as it moves in the centripetal direction, then

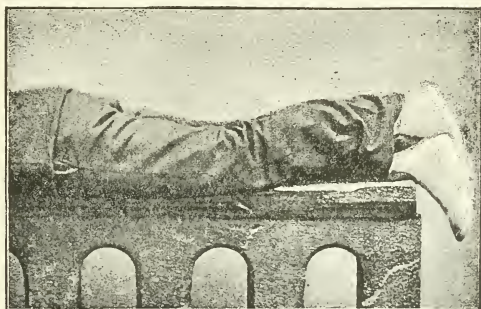


FIG. 5.

the pressure is relaxed, the thumb is lightly moved back to the starting-place, and the same action repeated. The movement should be given slowly and deliberately.

In the gluteal region the manipulation is made with the lightly-closed hand, and has the direction toward the sacrum. The patient can then bear the treatment much easier, and will allow it to go deeper.

The patient must always be placed in such a position that the muscles to be worked at are relaxed. Thus, in *pétrissage* for the gluteal region, he lies face downward, with the leg of the affected side crossed over the other, as in Fig. 5. He is not to stand bent forward, as is sometimes shown in illustrations, because the muscles are then more or less passively

extended, and prevent the proper application of the treatment.

In cases of incomplete fracture, or when the exudation is too great, gentle pétrissage with the first phalanx of the thumb enables one to come down to the seat of the injury, and thus aids to form a correct diagnosis.

When I treat effusion by pétrissage, I either pass over the whole of it two or three times, afterward making some strokes of deep effleurage, or I make one single stroke each time before moving the hand lower down.

The length of time to give pétrissage must of course vary with the case we are treating, it being necessary to apply it for some time in effusions and more serious complaints, while for simple stimulation of the muscles only a few minutes are necessary.

GENERAL PÉTRISSAGE OF THE ABDOMEN.

The position in which general or partial pétrissage of the abdomen is to be administered to the patient, is the recumbent

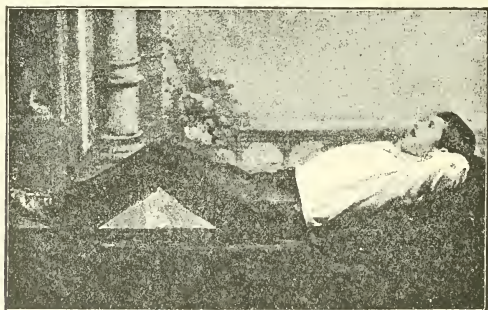


FIG. 6.

one shown in Fig. 6. It has for its object the relaxation of the abdominal muscles. The hands are folded behind the neck, in order to promote freer respiration. The patient is not allowed to lift the head up, because then the abdominal muscles at once contract, as any one may see for himself by lying down and raising the head. This result is very natural. The muscles which lift the head have their steady attachment on

the thorax, and in order that this may be able to act as a point of leverage, it must itself be steadied by the abdominal muscles.

In general pétrissage of the abdomen, the whole of the palmar surface of the hand is in contact with the abdominal wall. The hand is spread out over it, the fingers lying to the left in the interval between the lower ribs and the iliac crest, but somewhat nearer the former, while the thumb has the same position on the right side, and the base of the hand is a little above the pubic arch, with the strongest part, the ball of the thumb, near the right iliac fossa.

As this manipulation and others of the abdomen are never

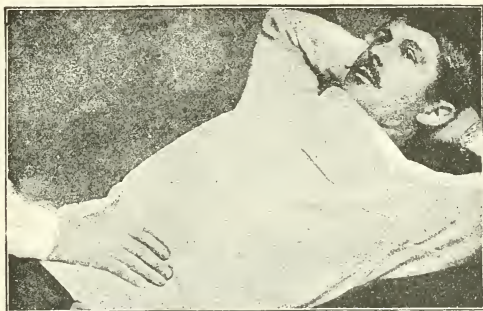


FIG. 7.

given on the bare body, it is of the highest importance that the part of the abdominal wall under the hand should follow it in its movements, otherwise irritation of the skin is caused. In order to decrease the possibility of this, the dress nearest to the skin ought not to consist of wool, but should be made of silk or linen. It is also clear that if the hand moves over the surface of the abdomen, the intestines are not acted upon, or only very slightly. It is of the utmost importance that the hand works firmly and yet softly, that there is no stiffness in any joint, and that the forearm is kept as nearly as possible parallel to the patient's body.

The movement itself has a circular character, and is generally started from below with the base of the hand. This, with slight extension (dorsal flexion) at the wrist, passes under

soft, gradually-increasing pressure to the right into the iliac fossa, and then upward in the line of the ascending colon. It is natural that the thumb is brought higher up and comes to lie close under the ribs over the hepatic flexure. The hand now moves, always in contact with the abdominal wall, and continuing its slightly circular way to the left, the thumb and the thenar part of the hand having overtaken the work. It is not enough to move the hand over; it is also pronated a little at the same time, and the thumb is adducted toward the fingers. These again, as the hand passes to the left, come over the splenic flexure, and in their turn become the principal agents. They move downward, bending more and more at the metacarpo-phalangeal joints, not at the phalangeal ones, and with a slight flexion at the wrist. As the hand passes lower and lower down close beside the os ilium, it is somewhat supinated, and when the wrist is again near the pubic arch, the base of the hand again takes up the work.

These manipulations, although described separately, do not exactly follow each other, but one begins a little before the other has ended, and in this manner the kneading is produced. If this were not done, there would, of course, only be pressure in one direction after the other.

From the wide extent of the movement, we see that the whole of the intestine becomes rolled and kneaded, the circulatory activity is increased, and this carries with it increased absorption and secretion, and also increased peristaltic action of the intestine. We can also understand that it must have a great influence on the circulation in general, because of the large number of blood-vessels contained in the abdomen.

I have described this general pétrissage of the abdomen as practised by my brother, Mr. Henrik Kellgren. He nearly always gives it for some minutes, as the final movement of a day's treatment, because he has found that it greatly increases the quickness of recovery. The movement is very difficult, and, indeed, nearly impossible to describe well, but is also as difficult and as impossible to give for any one who has not been gifted by nature with a good hand for the treatment, and it is necessary both to see and still more to feel it.

It is tiresome at first for beginners, or when given often, and the fatigue is especially felt in the small muscles of the thumb. Much relief, however, may be derived by placing the

fingers of the left hand on the thumb in such a manner that the tip of the long finger is over the phalangeal joint, and those of the fore and ring fingers respectively on the first and second phalanx.

Nearly all the organs in the abdominal cavity may separately come in for treatment. I will only describe special pétrissage for the colon and rectum, the kidneys, and above the pubic arch.

FOR THE COLON AND RECTUM.

Pétrissage is here mostly given for constipation. There are especially two places to which our attention must be



FIG. 8.

directed, viz., the sigmoid flexure of the colon and the splenic flexure of the colon. We begin the movement as far down in the pelvis as possible, and gradually pass upward. Each individual kneading always goes from above downward in the line of the intestine. The fingers are to be flexed only at the metacarpo-phalangeal joint, because if the fingers are bent the manipulation becomes pointed and painful, we cannot get down deep enough, and the kneading character is lost. As illustrative of this treatment, I may mention a case of constipation in a baby between three and four weeks old, which I had under my care while staying with a friend in Sweden last autumn. For two days medical applications had been tried, when I suggested to my friend, that his baby would not get

well until I had given it some pétrissage of the abdomen. He gave me a look that clearly indicated that he was not likely to allow me to try anything of that kind. As the baby's condition on the third evening had not changed for the better, and all the medical resources at my friend's disposal, down to soap suppositories, were at an end, his aversion to my proposal passed away, and he even asked me to do what I could. I simply gave light pétrissage of the descending colon for about one minute, without the child making the slightest sound; but I dare say it would have been different, if I had bent my fingers and worked more with their tips. The bowels acted very well during the night, and no further treatment was necessary.

The left hand is often used to support the right, and then the tips of its fingers are placed on the last phalangeal joint, and its palmar surface close to the back of the right hand.

FOR THE KIDNEYS.

We generally treat both at the same time. The abdominal wall must be very relaxed, as we need to bring the hand deep down before the manipulation can be begun.

The knees are bent somewhat more than in Fig. 6. The



FIG. 9.

thumbs are placed and kept steady on the abdominal wall, on places corresponding to the situations of the kidneys, just below the ribs; and the patient is told to breathe very deeply.

As he now makes strong expirations, we come further and further down, until we can at least easily feel the kidneys. Then the patient has to make thoracic respiration, so that the manipulation may not be hindered by the movement of the abdominal muscles. The kneading is made from without inward, and slightly from above downward, in order that the pressure may be applied in the direction of the venous circulation and the larger number of the renal canals. One kidney may be treated at a time. We then use the palmar surface of the fingers, and, while giving the treatment, stand or sit on the opposite side to the kidney subjected to manipulation.

ABOVE THE PUBIC ARCH.

In pétrissage above the pubic arch, the hand is placed just above it, and is spread out in a manner similar to that in general pétrissage of the abdomen. The movement here goes from side to side, and the kneading is made with the fingers and the root of the hand.

CHAPTER IV

TAPOTEMENT.

TAPOTEMENT means hacking or beating. The muscles principally in action are sometimes the flexors and extensors of the hand (palmar and dorsal); sometimes the radial and ulnar flexors. There is movement at the elbow. The joints of the wrist and hands are to be kept loose, no matter what kind of tapotement is given. This renders the manipulation

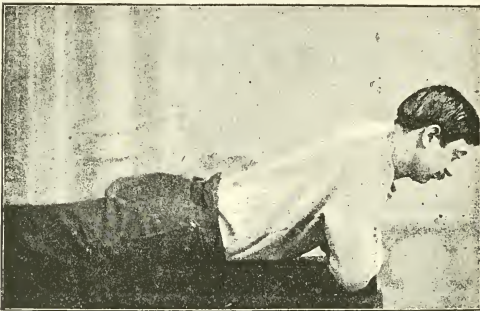


FIG. 10.

less hard and more elastic; the hand is heavier, and thus the effect of the stroke goes deeper.

The position of the hand, and the part of it which comes in contact with the body, must vary with the regions operated on.

The positions in which the patients are placed for the more advantageous application of this manipulation are generally:

For the Back.—The patient may lie face downward (as in Fig. 10), when frictions over the sensory nerves precede the manipulation, or he stands up slightly bending forward, with

his hands steadied, say against a wall. In both positions it is necessary to see that the chest is not compressed by a too near approximation of the arms to each other. They are never to be nearer than the transverse diameter of the thorax.

For the Liver.—The patient either has the hands folded behind his neck, as in Fig. 11, or with the right arm stretched up, as in Fig. 28.

For the Lumbar Region.—The positions are the same as for the back. We may also give the tapotement while the

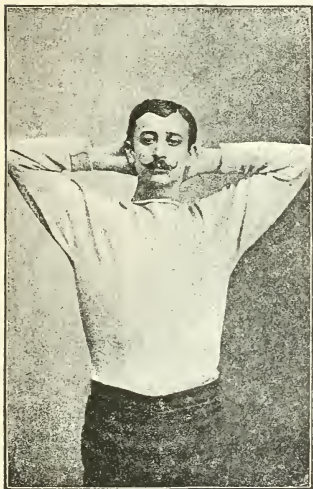


FIG. 11.

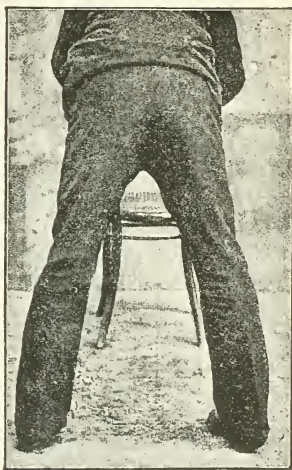


FIG. 12.

patient, with extended arms (upward), bends forward or sideways.

For the Sacral, Gluteal, and Perineal Regions.—The patient takes up the position shown in Fig. 12; or the beating is given in connection with the active movement shown in Fig. 56.

At the different parts of the body the tapotement is given as follows:

On the Head.—Tapotement is made with the ulnar side of the fingers, or with their tips; but this procedure is entirely

unnecessary, and nerve vibrations and frictions should be used instead.

On the Chest.—The palm of the hand is used (Fig. 13).

We see that the right hand, which is about to make the stroke, is not kept straight. It is only straightened out at the last moment, partly by a slight action of the extensor muscles, partly by the swing of the stroke. The difference between the stroke of a hand with fingers straight and the wrist stiff, and one held as I have just described, is indeed great. In the

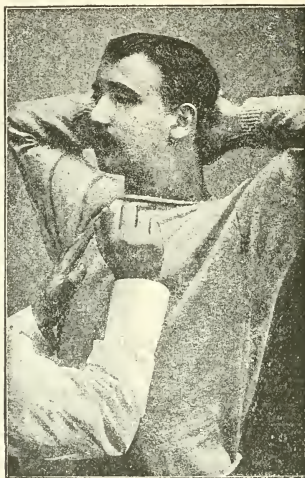


FIG. 13.

former case, the weight of the hand falling on the chest is lessened, and the effect is more external than internal, where it is expected to set the air into vibration, and stimulate the lungs.

The operator stands in front of the patient, and passes the arms round his chest until the hands have come well up between the shoulder-blades of the patient. He now begins the beating, passing up and down between the shoulder-blades, then over the sides of thorax, and lastly the front of the chest is treated. The patient makes deep and slow inspirations all the time.

It is given in chronic affections of the lungs, and is accompanied by movements which produce deep respiration.

On the Back.—The hands are kept midway between supination and pronation, with the fingers slightly bent (Fig. 14).



FIG. 14.

Just before the hand strikes the back it is more supined, in order that the ulnar edge itself may not strike, but that part



FIG. 15.

of the dorsal surface of the hand which is just outside it. The advantages of this are a softer blow, the fingers are spread out more, and deeper and superficial tissues are thus stimulated at the same time.

The movement should be carried three or four times up and down the back, parallel to and a little to the side of the vertebral column.

On the Lumbar Region.—We pass transversely over it, in order to be able to apply the treatment more powerfully, as the muscular mass is greater.

For the Liver.—The hacking is made over the lower part of the right side of the thorax, with the hand held in the same manner as for the back.

For the Sacral, Gluteal, and Perineal Regions, we keep the hands closed, but not firmly so. The stroke in the first



FIG. 16.

two cases is applied with the anterior part of the closed hand (Fig. 15); in the last, with the radial side (Fig. 16), because otherwise it cannot well enter the perineal space.

Tapotement in these places is made in connection with the treatment of constipation, disorders of the bladder, male and female generative organs.

For the Limbs.—The hands are either held in the same way as for the back, or the radial sides of the two hands are worked with simultaneously. The fingers are not to be kept extended, but loosely flexed, as in Fig. 17.

Whenever tapotement is given, stroke must follow upon stroke in quick succession, in order to increase the intensity of the manipulation.

The tapotement sets the muscular fibres into vibration, and

stimulates them to contract, the activity in superficial vessels and nerves is increased, and, as said before, when applied to



FIG. 17.

the back and thorax, the vibration is propagated on to internal parts. The duration of the manipulation is of necessity everywhere very short.

CHAPTER V.

MASSAGE À FRICTION.

For my own part, I cannot see the use of this expression, as the movement is certainly a kneading one, and thus only a modification of *pétrissage*.

The movement is the same as *pétrissage*, with the thumb alone, or with one or more of the fingers, but they are put at a greater—generally right—angle toward the part worked

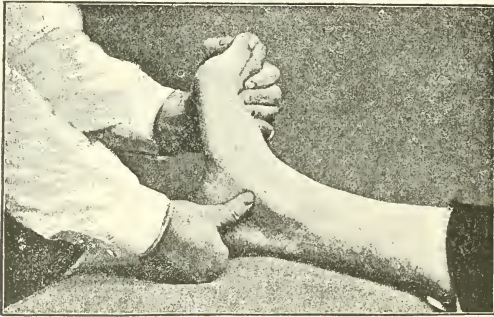


FIG. 18.

upon (Fig. 18); the circular or elliptical movement is smaller, and the pressure more equal throughout, as we wish simply by mechanical force to reduce thickenings and depositions. *Effleurage* follows on it, or is given alternately with the friction.

Massage à friction is chiefly had recourse to for organized exudations or hardened depositions, which we find round joints, such as the ankle, wrist, knee, etc., and for thickening of tendons.

CHAPTER VI.

GENERAL ROLLING AND SHAKING OF THE MUSCLES OF THE EXTREMITIES.

THE rolling and the shaking can easily be made at the same time on the limbs. The muscles must be completely relaxed. Take, for instance, the arm. The patient holds it in a horizontal position by steadying the hand on a table or the back of a chair. Both hands of the operator are placed lightly



FIG. 19.

on the arm, and are moved quickly round it as they pass up and down two or three times (Fig. 19).

The effect is very stimulating and agreeable to the patient.

This manipulation should be used after pétrissage, but may also be given alone in cases where there is no cause for a more special treatment of any particular muscle.

CHAPTER VII.

SHAKING.

THE part of the hand which, during the manipulation of shaking, comes in contact with the patient's body, is the distal phalanx of one or more fingers, and it or they should be applied softly and not pointedly.

The movement starts from the elbow-joint of the manipulator, where there is slight flexion and extension. Between it and the ultimate phalanges of the fingers, the bones of the forearm, wrist, and hands, with their intermediate joints, act, so to speak, as links in a chain, through which a wavelike motion is sent and propagated to the part worked upon.

The movement of the hand is very quick. The joints must not be kept stiff, but just so far extended that elasticity is permitted and not hindered. If this is not attended to, the manipulation becomes hard and pushing. The patient strains his muscles because of the pain and discomfort caused him, and the movement is either productive of bad consequences or has no effect at all.

This manipulation promotes and quickens resorption; it stimulates and strengthens; it diminishes pain by its power to reduce congestion and inflammation; and it increases the secretion of the glands.

It is given for a period varying in length from a few to several minutes, depending upon the disorder and the effect produced.

The illustrations which are appended to the various movements will make it easier to understand how the fingers are applied, and how they work at different portions of the body.

SHAKING OF THE PHARYNX.

There are three different manipulations for the pharynx, and these have already been described by me ("Medical Press and Circular," July 25th, 1888).

1st. The fingers of one hand are placed, with the palmar surface upward, as far back as possible, two on each side of

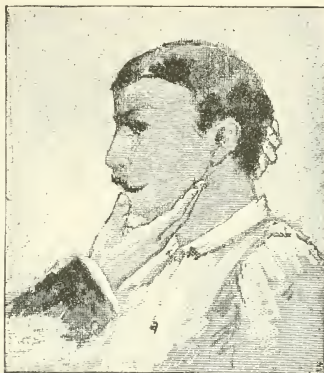


FIG. 20.

the root of the tongue. Then a quick, shaking movement is made in an upward and slightly forward direction (Fig. 20).

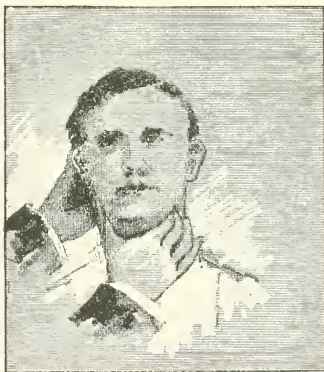


FIG. 21.

If, while giving this shaking, we move our fingers forward, it is evident that the tongue, submaxillary and sublingual glands, will be more especially affected.

2d. The root of the tongue is grasped between the thumb and the fingers, and shaken in a lateral direction (Fig. 21).



FIG. 22.

3d. The tips of the fingers are placed behind the ascending ramus of the lower jaw (Figs. 22 and 23).



FIG. 23.

Here the movement has the direction inward, forward, and downward. One side may be treated after the other, or both

simultaneously, and the operator may either stand in front of or behind the patient. The fingers must be pushed deeply in before the manipulation begins. The greater the distance the motion set up has to pass before it comes to the actual seat of the complaint, the smaller its effect will be.

The head ought to be bent a little forward, in order to relax the cervical fascia and the muscles, which would otherwise prove a considerable hindrance. As a security for this position, the free hand is placed either just above the forehead, or, better still, below the occiput.

The first two movements have in themselves a tendency to bring the head back, and this action is heightened by the patient himself; who instinctively draws away from the working hand, the more so if the complaint from which he is suffering be acute or painful.

When the third manipulation is given with one hand, the head is first turned a little to the opposite side, and then bent toward the one to be treated. This gives a much larger and freer space to work on.

The whole of the pharynx is more or less acted upon by these manipulations, and their effect, if correctly executed, is very rapidly beneficial in nearly all affections of the throat.

SHAKING OF THE LARYNX AND UPPER PART OF THE TRACHEA.

The tips of the fingers are placed on one side of the thyroid cartilage, and the thumb on the other (Fig. 24).

The shaking is made sideways. This movement has little effect on the larynx itself, which moves as a whole, but acts more particularly on the part of the trachea below it, as the wave motion passes downward. It is therefore of use in croup and affections of the upper part of the trachea.

If, retaining the same position of the hand, and passing it downward, we make a similar side movement, we act more directly on the trachea itself; and the nearer we approach the sternum the more deeply into the chest is this movement propagated.

Instead of grasping the trachea, we may place two or more fingers on it, in the hollow of the sternum, in the manner

shown in Fig. 25. In this manipulation it is of the highest importance that the hand lies close to the throat, in order that the angle formed between the fingers and the trachea may be as small as possible. When the angle is increased, the movement loses its softness; it becomes disagreeable to the patient; the motion produced is, of course, less in the direction of the

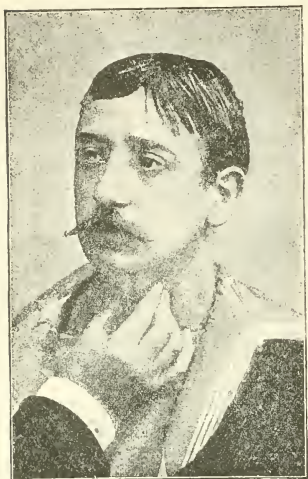


FIG. 24.



FIG. 25.

trachea, and thus its range of effect becomes more and more limited, until, when the angle is large, the benefit is practically nil.

The patient must sit perfectly upright. The shoulders are to be well thrown back, in order that the respiration may go freely and well.

These shakings, accompanied by tapotement on the chest and between the shoulder-blades, are of very great service in bronchitis and chronic disorders of the lungs.

SHAKINGS OF LOWER PART OF THE THORAX.

The patient stands with the hands folded behind his neck, as in Fig. 26.

The operator places one hand on each side of the lower part of the thorax. With the palms he makes soft and quick

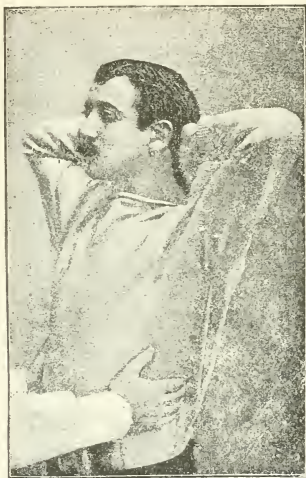


FIG. 26.

compressions, alternating with relaxation. During the latter the hands are not to be lifted from the thorax, but should remain in close contact with it. The patient must breathe deeply. The ribs, being elastic, rebound when the pressure is left off, and the respiration becomes freer and deeper. Besides this, the movement has the influence on pleuritic adhesions at the lower part of the thorax of breaking them down, and the organs in the upper part of the abdominal cavity, below the vault of the diaphragm, are also affected.

This movement is usually given after tapotement of the chest.

SHAKING AT THE PIT OF THE STOMACH.

The patient either stands (Fig. 27), or lies in the recumbent position, as in Fig. 6, in both cases with the hands folded behind his neck. The fingers are placed midway between the ensiform cartilage of the sternum and the navel. We see from the position of the fingers, that they have above them the pyloric part of the stomach and the left lobe of the liver, while

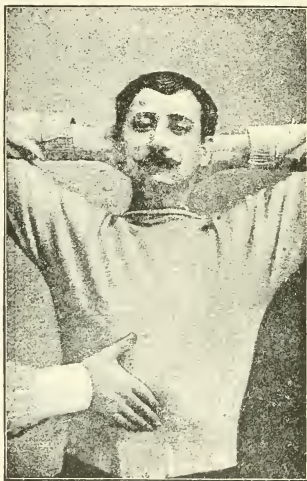


FIG. 27.

just beneath them lies the solar plexus. The movement is made in a backward and slightly upward direction. As the stomach and its continuation, the duodenum, have involuntary muscles in their walls, which are more sensitive to stimulation by reason of their tendency to automatic contraction, and as the solar plexus commands the circulation in the abdomen, we may readily understand that this manipulation must indeed have a great effect. It is therefore used in chronic affections of the stomach and the liver.

Shakings at this spot, when made gently, will relieve

spasms in the diaphragm. For this I have used it with success, both when the cause was reflex, as in hiccough, and in chloroform narcosis.

The stomach and the liver may separately come in for treatment, as we, continuing our shaking, follow the lower border of the thorax to the left or to the right. On our way toward the right there is one place which needs special attention, viz., just under the ninth rib cartilage and the outer



FIG. 28.

border of the rectus abdominalis muscle, where the gall-bladder lies. In patients suffering from impaction of a biliary calculus in the duct, shaking here is sure to be attended with success.

In the recumbent position it is usually given with general pétrissage of the abdomen. When the shaking is administered separately for the liver, the standing side position, as in Fig. 28, is mostly preferred; and in the same attitude, with the left arm raised, the stomach can also be treated.

In derangements of the liver we can in this position work with the left hand between the lower part of the shoulder-

blade of the right side and the spine, where we are certain to find tender places.

It is always usual to accompany shaking of the liver by tapotement over the right side of the thorax.

It is evident that when we follow the lower border of the thorax toward the left, and give the shaking, that the spleen must also be acted upon. I have seen this mode of treatment produce marked change for the better in patients suffering from enlarged spleen, resulting from malaria.

If the hand is spread out over the surface of the abdomen, and strong shakings made, the whole of the intestine is stimulated to greater activity, the peristaltic movement is increased, and the secretion from the glands is brisker; and thus they are indicated in sluggish action of the bowels.

SHAKING OF THE BLADDER.

For the shaking of the bladder we have three positions. In two—the recumbent and the standing—the manipulation is



FIG. 29.

given above the pubic arch (Figs. 29 and 30); and in the latter the patient bends slightly forward, in order to relax the abdominal muscles. In the third he lies in the prone position, with the legs a little apart, and the toes turned inward in order to give more room.

When the bladder is acted upon from above, the fingers are placed about one inch superior to the pubic arch, and the di-

rection of the shaking is from above, downward and backward. In the perineum the fingers are placed just in front of the anal aperture, and the movement passes downward and forward.

By this manipulation we act on the bladder and the prostate, and if we change the direction from below upward in



FIG. 30.

the prone position, the lower part of the rectum comes in for treatment.

In the same position, and for females, backward displacements of the uterus are relieved.

This manipulation ought in every case to be followed by the lighter vibration described further on, and by nerve frictions over the sacral, gluteal, and lumbar regions; and should be preceded by tapotement over the same parts.

CHAPTER VIII.

VIBRATIONS.

THE vibrations are, one might say, only fine shaking movements.

The whole or part of the palmar surface of the hand or fingers is used in this kind of manipulation. If we look at the illustration representing vibration of the thorax (Fig. 33), it will be easier to understand its mechanism. Here, as in the shaking, there is flexion and extension at the elbow, but they are much smaller. The movements in the loose wrist-joint are abduction and adduction (*i.e.*, radial and ulnar flexion) of the hand, which lies immovable, so far as the part of the surface of the body on which it rests is concerned. Through the quick succession of the individual movements the vibrations are produced. If flexion and extension are allowed at the wrist, pressure is caused. The injurious influence of this in different localities, say over a weak heart, certainly needs no explanation.

As the vibrations are so often used in order to relieve pain, it is evident how important it is not to work with a stiff hand and wrist. Indeed, the entire advantage of the movement is lost if this be not attended to. On the other hand, when given correctly the vibrations are bound to relieve pain, no matter what the cause of the pain may be.

The straining of the muscles in the operator's arm ought to be so slight as to be scarcely perceptible to any one who has his hand over them.

On no account are the vibrations to be produced by the continued strong contraction of the muscles of the shoulder, arm, and hand. When given thus, the manipulation becomes hard, and the intensity, the acute sensibility that the operator should have of the pressure he is applying, gets lost, while it is impossible to continue the treatment for any length of time, even for a few minutes. The effect over a weak heart is as

bad as flexion and extension at the wrist-joint, if not worse. The patient will constantly feel pain, because pressure cannot be avoided, and maybe he will faint.

I will give a few instances in which one can perceive the difference between a movement produced by strong contraction of the muscles of the arm—which of course carries with it an immovable wrist and hand—and the way in which I have described it:

1. Place the hand on the thigh. In the first kind of manipulation a harder grip of the muscles is necessary, the muscular mass moves as a whole, there are no vibrations just under the place of application of the hand, the range of the movement produced is much smaller; while in the second, the hand lies loosely on the surface, the vibrations pass into and are felt in the underlying muscles, and are widely propagated.

2. You may give vibrations to the anterior surface of the thorax, and feel them in the other hand placed on the back of the patient, while with the stiff arm and hand you feel nothing at all.

3. Place a glass of water in the middle of a fairly large table. Make the vibrations, and if the water moves as a whole from side to side they are made wrongly, but if the surface of the water quickens in the centre only they are made correctly.

This may give an idea of how delicate the movements really are, and how it is possible to use them in disorders where shakings and the ordinary massage manipulations are entirely out of question.

The vibrations have a much greater effect than the shakings in the production of resorption, and especially in diminishing pain, both of which can be seen in congestions and acute and chronic inflammatory conditions.

VIBRATIONS OF THE EYES.

There are two kinds:

1. The patient closes the eyes, and the operator, standing behind him, lays two of the fingers on each eye, and commences the vibrations (Fig. 31). He has to take care that the eyelids do not move up and down, but are kept steady on the eyeball, so that the vibrations pass through them.

2. We may place the distal phalanx of the thumb on the

outer side of one eye, and the same phalanx of the fore and long fingers on the outer side of the other eye (as seen in Fig.



FIG. 31.

32), and make the vibrations. They ought to be felt deeply through the eyeballs.

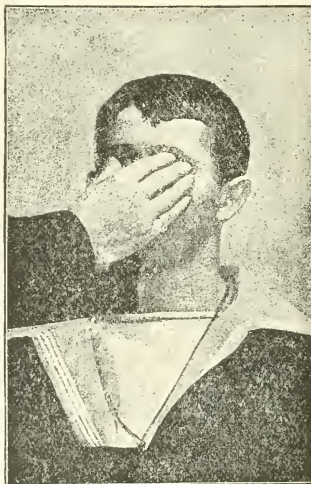


FIG. 32.

The first movement, which does not penetrate so deep, affects the superficial parts, while by the latter the deeper

parts are more acted upon. They should always be accompanied by frictions and vibrations over all the sensory nerves round the eye, and also by frictions on the eyeball itself, as will be described later on.

I have found these movements to be of great benefit in affections of the cornea and conjunctiva, not only in relieving the inflammation, pain, and photophobia, but also in accelerating the healing process.

VIBRATIONS OF THE THROAT.

When vibrations are given for ailments of the throat, the fingers are placed in the same position as for shakings; and the former are here always substituted for the latter at the beginning of acute inflammation.

As there are many glands in this region, I may at this point state that whenever enlarged glands are treated by the manual method, these vibrations should be used, and they will not be had recourse to in vain.

VIBRATIONS OF THE LARYNX.

For the larynx the application of the fingers is the same as shown in Fig. 24, and it is evident that the vibrations have a direct effect on the larynx itself, while the shakings tend to pass over it.

VIBRATIONS ON THE THORAX.

The position of the patient should be either lying down straight on his back, with the hands clasped behind the neck, or standing up, as in Fig. 33.

The place of application of the hand in giving vibrations for the thorax, varies with the nature of the disorder we are treating. The whole hand is here used. It lies loose and free, without pressure, on the thoracic wall. The vibrations pass through the thoracic wall to the lungs, which they stimulate and strengthen. They produce free expectoration, followed by less irritation, promote rest and a feeling of ease, and, when administered in conjunction with nerve frictions between the shoulder-blades, etc., also reduce congestive and

inflammatory conditions. The vibrations on the thorax are given for all diseases of the lungs, and they must be continued for some minutes.

It may be interesting in this connection to mention a case that recently came under my care. Last January, a young gentleman, twenty-two years old, consulted me on the subject of a constant dry and hacking cough with which he was troubled. In February, 1888, during a stay in India, he had



FIG. 33.

contracted a cold, and the cough had remained with him since, gradually increasing in severity. The patient had previously been in South Africa, where he had gone through an acute attack of fever. In the spring of 1889 he returned to Africa, where he soon fell a victim to dysentery, and was dangerously ill for six weeks. It was not considered possible for him to continue out there, so he returned home in the autumn. The patient did not rally properly, but remained very thin and pale; the cough grew more intense, and greatly troubled him at night. He had attacks of dysentery at least once a week. In company with the increase of the cough came breathless-

ness on walking quickly or going up-stairs, a feeling of lassitude, and profuse sweating—the patient, to use his own expression, being bathed in perspiration. Deep inspiration gave pain at the tip of both the lungs, more so on the right side; same on coughing. Respiration was short and quick—even up to thirty-eight in the minute. Slight dulness at both the apices — more marked on the right side. Appetite not good.

The lung symptoms were treated with vibrations and tapotement of the thorax, movements causing deep respiration, nerve frictions, and tapotement between the shoulder-blades, especially at the upper part, where the patient was very sensitive; the dysentery with vibrations and general pétrissage of the abdomen. In addition, the patient received some general treatment including nerve frictions.

The cough gradually passed away; the sweating during the night ceased; the respiration grew deep and free—sixteen to eighteen a minute; no breathlessness; the appetite was good. During the time he was under treatment the patient had no attack of dysentery. He has enjoyed excellent health ever since.

The treatment lasted a fortnight.

VIBRATIONS OVER THE HEART.

If we are to give vibrations over the heart, they must be given very carefully, the hand being placed lightly over the apex. Just as their effect is good when properly executed, so the result is mischievous when they are unskilfully performed. A weak heart has already more than enough work to do, and if a heavy hand is added, rendered still heavier by a stiff wrist, together with flexion and extension at the same place, it is no wonder the patient feels anything but ease, and frequently pain, and sometimes even faints.

According to the condition of the patient, he may lie or stand—the arms may be up or down, and the hands fixed behind the neck (Fig. 33)—but the chest must always be well thrown out.

The effect of the vibrations is a stronger, quieter, and better beat. This is well seen in a fainting fit when the heart stops or begins to flag, and also in the opposite condition, viz.,

palpitation. During the former, the beat soon comes back or grows stronger; while in the latter steadiness in its action returns.

In fainting from shock, the simplest method of reviving the patient is to compress the internal jugular veins.

VIBRATIONS OF THE ABDOMEN, OR PART OF IT.

For vibrations of the abdomen in general, the position of the patient and the position of the hand are precisely the same as in pétrissage. For special situations, part of the palm and fingers, or the back of the fingers of the lightly-closed hand, are used.

These vibrations are valuable in relieving pain and stopping diarrhœa, whatever the cause of these may be; but they should never be given in cases of constipation, for they tend to produce this condition.

In connection with the action of vibrations of the abdomen on diarrhœa, I may mention the case of a gentleman, about fifty-seven years old, who suffered from this complaint. For five or six weeks he had felt pain and discomfort in the abdomen generally. During day and night he had frequent calls to stool, and the motions were constantly mingled with blood. After two treatments his bowels acted perfectly normal, and the pains had of course disappeared.

A friend of mine, a young Swedish officer, whom I met while at Stockholm last autumn, had suffered intensely from diarrhœa for some weeks before he mentioned the fact to me. He was growing seriously pale and thin. I treated him for the first time one evening before he went to bed. The night that followed that treatment was the first during which he had complete rest for over a fortnight; while previously he had been obliged to rise several times every night. I continued the treatment for a few days; and during the four or five weeks I afterward stayed in Stockholm he had no relapse.

As regards pain, I have relieved it both in colic, in acute general peritonitis, and perityphlitis. The effect of vibrations in causing constipation is of marked advantage in cases of this kind, where action of the bowels is contra-indicated.

For the bladder, it is better to use the back of the flexed fingers, and the hand should be well down in the pelvis.

At the pit of the stomach we have recourse to vibrations in painful gastric conditions, such as ulcer, acute catarrh, and nervous dyspepsia. They probably produce their effect through the solar plexus of the sympathetic.

When we use them for pain at the menstrual period, p.p. hemorrhage, metritis, endometritis, etc., the uterus must be grasped between the fingers and the thumb, and quick and light frictions made at the same time as the vibrations. This mode of treatment dispenses with the internal manipulation in the above-named disorders.

In vibrations for affections of the anus, such as hemorrhoids and prolapsus, the last phalanx of one or more fingers is used. In prolapsus ani, the tips of the fingers are placed round the protruding mass before the vibrations begin.

In treatment of piles it is not sufficient to apply local treatment; but shaking of the liver, pétrissage of the abdomen, etc., must also be resorted to.

VIBRATIONS OVER ULCERS.

It is necessary to cover the ulcer with a piece of linen or lint moistened with some antiseptic solution, and over this again some gutta-percha, in order to prevent the heat of the hand from passing to the ulcer. The palm of the hand is afterward applied, and the vibrations made. These have to be combined with pétrissage round the ulcer, in order that the parts surrounding it may be kept healthy, and stimulated to greater activity.

VIBRATIONS FOR FURENCLES AND ABSCESES.

The tips of the fingers and thumb are placed at the periphery of the affected tissues, and during vibrations are approximated to each other, passing gradually toward the middle. The effect of this is to drive the degenerated blood serum to the centre, and pointing takes place quicker. When the abscess has been opened, this manipulation removes the pus from the abscess cavity more completely and painlessly than by the ordinary method of pressure.

CHAPTER IX.

NERVE VIBRATIONS.

IN the "Medical Press and Circular" of July 25th, 1888, I have already spoken about the different ways of causing nerve vibrations, and perhaps I may be allowed to quote what I then said: "The manipulator causes the nerve to vibrate either by frictions made transversely over it, in a manner similar to that in which a harp-player passes his fingers over the strings of his harp; or he makes vibrations over the nerve. When the latter method is adopted, he either follows its course with the tips of his fingers in a centripetal direction, or he keeps them fixed, and vibrates upon such parts of it as are more painful.

"The different methods of procedure (frictions or vibrations) depend upon the position and surroundings of the nerve. Nervus medianus is very suitable for demonstration of the first. The arm is abducted until it reaches the horizontal position. The nerve coming out of the axilla can be easily felt as a thick cord lying to the outside of the bronchial artery. When the tips of the fingers are quickly drawn over it transversely in the manner indicated above, a feeling is produced similar to that felt on electric stimulation. Nervus supra-orbitalis, which lies on the bone, is a good instance where the second kind of procedure may be employed.

"It is essential that the tissues which lie between the fingers and the nerve should move with the former as one; otherwise the friction does not reach its destination, and the manipulation becomes useless.

"According to my own experience, the effects of this mechanical method are, so far as I can judge—

"1. *Raising of the nervous energy.*

"2. *Diminution of pain* (as seen in facial neuralgia, sciatica, migraine, and similar disorders).

"3. *Contraction of the smaller blood-vessels.* (Heaviness

of the head is quickly relieved by stimulation of the sensory nerves of the scalp. Frictions over the sensory branches of the cervical and brachial plexuses in the neck produce in nearly every person a chilly feeling passing down over the body, often accompanied by cutis anserina.)

"4. *Stimulation of the muscles to contraction.* (In several persons in a weak condition, and some whose nervous system was highly irritable, I have seen this well marked; frictions over the N. musculo-spiralis being followed by corresponding flexion and extension of the wrist, and also of the fingers.)"

I may mention that in a lady patient, whom I have seen during the last weeks of my stay at Pola, and who suffered from spastic (reflex) paraplegia, whose inferior extremities had remained stiffly extended for nearly five years, after a difficult child-bed, contraction of the muscles and flexion of the legs instantly followed stimulation of the nerves of the leg and those under the foot. They returned to their extended position when the stimulation ceased; but, after treatment for a few times, the feet could be separated for a distance of about 20 cm., and the stiffness of the knee and ankle was not so absolute as before. I can add—

"5. *Increased secretion of the glands.* (Frictions over the facial nerve, or in the situation where the submaxillary ganglion lies, are instantly followed by increase of the secretion of saliva.)

"6. *Diminished excretion from the skin.* I have often noticed while treating patients with frictions over the cervical nerves that the perspiration which at first has been perceptible all over the body has quickly disappeared under the influence of these movements, and that free perspiration in the palms of the hands has passed away on frictions being applied to the median nerve.

"7. *Decrease of temperature.* This is well marked in fevers and feverish conditions.

"As regards pressure on the nerves, I have found it very useful in many cases of migraine and neuralgia. The pressure was kept up for a period varying from a few to several minutes at the time, and after a slight interval renewed, the whole lasting from five to twenty minutes."

My brother, Mr. Henrik Kellgren, has, during the last twenty years, worked out and greatly developed this system

of direct mechanical stimulation of the nerves. Ling and his pupils had already an idea of this method, as is shown by the writings of Georgii ("Traitement des maladies par le mouvement," Paris, 1847).

They had noticed the effect of frictions applied from the front backward in the line of the longitudinal sinus, and also of the lateral one. They found that these frictions produced not only a contraction of the skin on the cranium, but also a

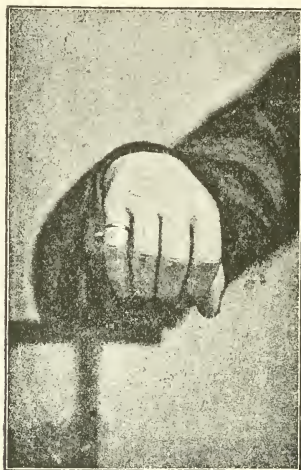


FIG. 34.

shivering feeling down the back, and they used them with success in several cases of fulness of blood in the head and congestion of the brain.

The fingers and the thumb are kept slightly bent, so that the back of the nails come in contact with the scalp, and with light vibrations they are passed backward (Fig. 34). When they arrive at the occipital protuberance, the fingers follow the direction of one of the lateral sinuses, the thumb that of the other.

That the effect of these vibrations should be considerable, we can deduce from the feeling they produce; as also from

the fact that all the sensory nerves of the scalp pass up to the vertex, and are thus acted upon.

These frictions ought never to be omitted in a general treatment of the head. With them we must give movements which draw the blood away from the head or toward it, according to the requirements of the case.

Ling and his pupils also tried frictions over the phrenic and great sciatic nerves. The former they manipulated, in order to relieve spasm of the diaphragm. This is easier, and with greater certainty allayed by light shakings in the pit of the stomach, as was well seen in a patient at the Marine Hospital at Pola, who during chloroform narcosis was seized with this spasm. The shakings had the direction from below upward and backward.

Whenever a sensory nerve is stimulated by electricity, it causes contraction of the blood-vessels. Since these frictions over the median and several other nerves give exactly the same feeling as that from an electrical shock, and as the chilly sensation passing over the body, accompanied with cutis anserina, must be caused by contraction of the smaller blood-vessels of the skin, these frictions, with their consequent vibrations, must produce the same effect as the electrical stimulation does. I have taken this as the guiding idea for the use of this form of nerve stimulation, and the results certainly seem to justify the belief.

We must take care, however, before this mechanical stimulation is applied, either to feel the nerve or be perfectly certain as to its topographical situation, and to be well down on it when it lies deeply, as, for instance, in the case of the great sciatic in the gluteal region.

When we have to do with a muscular or mixed nerve, and our intention is merely to stimulate it in an ordinary way, we give frictions, and may pass up and down its course; but when pain is present, or the nerve purely sensory, vibrations alone, or followed by constant pressure, are to be preferred. The vibrations are then administered as previously described. We ought also to remember, that we have often several nerves coming from the same plexus, and that although only one branch of a nerve may seem to give pain, the other nerves or branches send their stimulation to the same centre, and thus act reflexly on the affected nerve or branch.

There is no doubt but that in these nerve vibrations, combined with other passive and active movements, a powerful weapon has been given us against the progress of most of the nervous diseases. I have seen several cases of paralysis, locomotor ataxia, spastic paralysis, infantine paralysis, etc., which have been greatly relieved. The result of the manual method in these and other nervous diseases would be still more successful if the patients had recourse to the treatment sooner. At present it is used as the last plank after everything else has failed. Not only have we then to contend with the diseases in their very advanced stages, but also with the sunken courage and lost energy of the patient, which react so unfavorably on his general health.

I may now proceed to give some directions as to the best and easiest places to find the different nerves.

NERVES OF THE HEAD AND NECK.

NERVUS OCCIPITALIS MAJOR, NERVUS OCCIPITALIS MINOR, AND NERVUS AURICULARIS MAJOR.

These are all branches of the second pair of cervical nerves, the latter also having a root from the third pair. We find them best a little below the lower half of the mastoid process (Fig. 35). Frictions there cause a feeling of coldness to run down over the body; and if they are made strongly, pain is felt, not only at the points of application of the fingers, but also inside the head, as far forward as the frontal region, and up on the vertex.

Treatment of these nerves relieves headache and congestion of the brain, and its effect is extremely good in hemicrania, sleeplessness, etc. In migraine, the above-mentioned feeling of pain is most beautifully demonstrated. I have, with treatment of these nerves, also cured severe headaches in fevers. During my stay at Pola there was a slight epidemic of cerebrospinal meningitis. A naval officer was brought to the hospital, suffering from this disease. He had had for four days and nights most severe headache and fever. Antipyrine, subcutaneous injections of morphia, and other remedies, had been tried, but the headache did not diminish, nor did he obtain sleep. I was asked to try to relieve him. I gave him fric-

tions over these nerves, alternating with constant pressure, vibrations on the vertex in the line of the longitudinal sinus, as described before, together with some other passive movements which lead the blood from the head, and finished up with general pétrissage of the abdomen. After the first treatment in the morning, the headache disappeared, and the patient slept for some hours. I treated him again in the afternoon and evening. As the latter approached, he had oc-

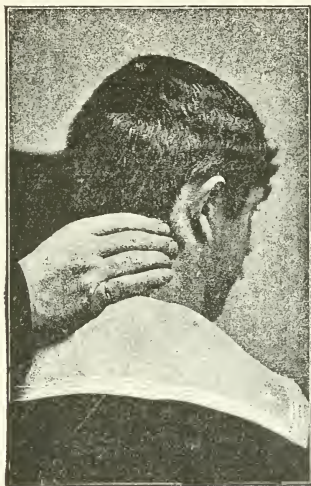


FIG. 35.

casionally slight headache, but it soon passed away. After the last treatment he felt free in his head. During the night he slept well, and the following morning had no headache. The headache did not reappear.

At first, vibrations should be made for several minutes, and then an immovable constant pressure kept up with the fingers. The patient feels at first severe pain in the head, but this either passes entirely away during the manipulation, or disappears very shortly after the cessation of treatment. When there is congestion of the brain and fulness of blood, all the nerves of the scalp should be treated.

NERVUS SUPRAORBITALIS.

This nerve is best found at the supraorbital notch or foramen. If there is a notch, the nerve is easy to find; but when it passes through a foramen it is best reached by placing the tip of the fore or long finger in the orbit, and feeling it as it lies against the roof just before it goes into the foramen. In these two situations, it is better to make frictions over it with



FIG. 36.



FIG. 37.

the back part of the nail, taking care not to apply the edge. (Note the strong bending of the last phalanx in Fig. 36.)

On the forehead we first trace the nerve from the notch upward under light frictions, and we find it lying like a thin cord, curving somewhat outward toward the temples. Having delineated its course, the vibrations are begun, and made time after time in the centripetal direction (Fig. 37).

Fig. 38 shows how the thumb is applied to the forefinger when we work with the back of its nail, viz., not at the very tip, but nearer the last phalangeal joint. This imparts greater softness to the manipulation.

For neuralgia in this nerve, it is often enough to treat it alone; but if this is not successful, I give vibrations over the other branches from the same nerve stem.

NERVUS SUPRATROCHLEARIS AND NERVUS NASALIS.

The supratrochlear nerve comes out at the inner part of the orbit, and it runs nearly vertically upward.

The nasal nerve is found to emerge on the side of the nose at the nasal bone with the cartilage.



FIG. 38.

Vibrations over these two nerves are very beneficial, in catarrh of the nose, cold in the head, and its accompaniment, frontal headache.

A sensory twig, probably from the lachrymal nerve, turns round the edge of the orbit at its outer side, just opposite the outer canthus. Light frictions or vibrations there cause, even in sound persons, considerable irritation, while on those who have any affection of the eye the pain is very pronounced.

NERVUS MAXILLARIS SUPERIOR AND NERVUS MENTALIS.

If we pass down in a straight line from the supraorbital notch, we have no difficulty in finding these nerves, where they come out of their respective foramina. I have cured neuralgic toothache at once; and even in cases where the tooth has been

diseased, the pain often subsided when vibrations were applied over the nerves for a few minutes. I have also by the same treatment stopped the aching in the teeth and jaws following on strong mercurial inunction.

NERVUS FACIALIS.

Frictions can most easily be applied to the facial nerve where it comes forward over the ascending ramus of the in-



FIG. 39.

ferior maxillary bone. They are made from above downward (Fig. 39).

The first effect, on friction being applied, is a peculiar sparkling sensation, not only over the side of the face, but also in the pharynx, and very frequently, too, in the ear.

This nerve, of course, should be stimulated in cases of facial paralysis.

While working under my brother, I had occasion to see two cases of complete recovery. One of the patients was a little boy, five years old, the other a girl of fourteen.

In all disorders of the throat, this nerve comes in for treatment, not only because of its connection with the pharynx, but also in order to produce increased flow of saliva from the parotid gland.

NERVUS LINGUALIS.

In order to find the lingual nerve, we must bend the head a little to that side on which the nerve which is to be subjected to treatment is situated, and the friction is made from within outward. This also increases the secretion of saliva from the submaxillary glands.

If the patient sits with his head erect, and if we make a friction from behind forward between the submaxillary gland and the bone, a sparkling sensation indicates that the submaxillary ganglion has been touched.

NERVE FRICTIONS AND VIBRATIONS ON THE EYEBALL ITSELF.

The patient is told to look downward, and then to close the eyes. The tip of the forefinger is placed on the upper part of



FIG 40.

the eye, just to the inner side of the vertical diameter of the eyeball (Fig. 40).

Light frictions here cause a strong sensation, which is felt not only in the eye itself, but may even be experienced inside the skull at its anterior part.

At other places on the eye, the feeling is not so well marked. The patient has more the sensation of having sand in the eye.

These nerves are to be stimulated in affections of the eye, and also in migraine and ordinary headache. In a patient

who had lost a great deal of blood, and, following on this, suffered from a very severe headache, I had recourse to these vibrations on both eyes simultaneously, since all other treatment seemed of no avail. I was obliged to give the frictions for about fifteen minutes before the headache ceased entirely.

NERVUS LARYNGEUS SUPERIOR.

This nerve is easily reached where it lies below the great cornua of the hyoid bone, and before it pierces the thyro-hyoid

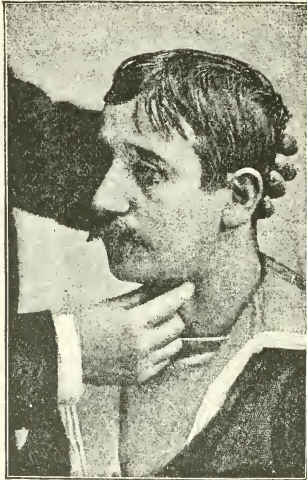


FIG. 41.

membrane. The finger tip is placed at the posterior end of the upper border of the thyroid cartilage, and quickly drawn forward (Fig. 41).

Pain is felt at the place of application, in the larynx, often in the ear and pharynx, and up in the head. Indeed, when I practise this treatment on myself, and continue it for a few seconds, I feel either pain or prickling in these places; and in the brain I have a sensation as if a strong band were bound round it.

These nerves must be stimulated in affections of the larynx.

NERVUS LARYNGEUS INFERIOR.

The head should be bent toward the side on which lies the nerve to be stimulated, and slightly forward. The finger is passed down beside the trachea to the inner side of the lower part of the sterno-mastoid muscle, and the friction is made toward the windpipe. Administered to healthy persons, it generally causes cough.

NERVUS VAGUS.

The vagus nerve lies in the sheath between the carotid artery and the internal jugular vein. We must have the head flexed a little forward, and feel for the pulsating artery. The finger is placed just outside it, carefully pressed downward, and afterward quick and sharp frictions are made transversely. In a patient with bronchitis or allied affection, this nearly always produces cough, and it should be given in combination with shaking of the trachea. Its effect on the heart is utilized when the action of the latter is too strong; and this effect must be taken into consideration in treating patients with weak hearts, or fainting may ensue. In derangements of the stomach and liver, frictions over this nerve often produce vomiting.

FIRST CERVICAL SYMPATHETIC GANGLION.

We stand behind the patient, whose head is at first slightly bent backward. The finger is then passed high up inside the angle of the lower jaw. We next flex the head forward, and as the cervical fascia relaxes, we pass the finger upward and backward until we reach the front of the vertebral column. The finger is now passed quickly from side to side, when pain is produced, varying in sharpness and extent of distribution according to the force with which the friction is given. The pain may be felt on the whole side of the head and pharynx. I have several times had patients under my hands, who, from frictions not over strong, have had a feeling of fainting. If the wideness of the distributing and connecting branches of the nerve are taken into consideration, these results may to some extent be accounted for.

CERVICAL NERVES.

Here, also, just as is shown in the illustration of nerve frictions over the second cervical pair (Fig. 35), we use the tips of the fingers on one side, and the last phalanx of the thumb on the other. We place them on the edges of the trapezius muscle. A sharp and quick friction is made at the same time as the tips of the fingers are approximated to that of the thumb. I have often seen, or rather felt, that new beginners have the habit of using equal pressure, or they push the fingers into the neck. On no account should this be done. The primary cause of the error, as in so many other cases of faulty manipulation, lies in the stiffness in the fingers and hands. This only gives pain, which is very unnecessary, instead of producing the symptom of correct application—*i.e.*, a cold feeling running down over the body.

As we pass down the neck, the distance between the points of application of the tips of the fingers and the thumb is somewhat increased; otherwise the frictions fall inside the places where the sensory nerves lie freer, and no effect at all is produced.

We must take advantage of these nerve frictions in fevers. It is then necessary to continue them for several minutes, the duration, of course, being dependent on the severity of the case.

For my own part, I always direct my attention specially to the places where the second pair of cervical nerves emerge.

NERVES OF THE TRUNK.

LATERAL AND ANTERIOR CUTANEOUS BRANCHES OF THE INTERCOSTAL NERVES.

If we make frictions somewhat obliquely from above downward over each intercostal space, a little anterior to a longitudinal line drawn midway between the anterior and posterior folds of the axilla, we shall find the lateral cutaneous branches of the intercostal nerves.

The anterior cutaneous branches of the intercostal nerves, from the second, third, and fourth, are especially large, and supply many branches to the mammary gland.

These anterior intercostal cutaneous branches are at once found where they come out in the intercostal spaces near the sternum.

Stimulation of these nerves and of the descending cervicals, passing down over the clavicle, is of importance, because they not only supply the skin over the chest, but also the mammary gland; and hence there are often shooting pains toward the neck and arms in inflammatory and other diseased conditions of the gland.

For the summer, 1885, I had charge of my brother's institution in London. A lady, about forty years of age, residing at Kensington, came for the treatment, having a hard lump at the upper and outer part of the left mamma. The skin was somewhat retracted, and could not be separated from the tumor.

This had been forming for some months, and was now an inch and a half in diameter. The patient complained of severe pain, which, when at its height, also passed down the left arm, and prevented her from sleeping.

The movements I prescribed were: Vibrations over the above-named nerves to be continued for five minutes; vibrations on the tumor itself for twenty minutes or more, until the pain was relieved; and a general treatment of active movements.

The patient was treated twice a day, having the special movements only in the evening. At the end of nine months she very seldom felt any pain. The tumor had gone, and only some fibrous strings could be felt at the original site of the swelling.

DORSAL SENSORY NERVES.

When we make frictions over the dorsal sensory nerves, the patient usually lies in the prone position, as for tapotement of the back; in fact, we seldom give the latter alone, but usually precede it with the former method of treatment. The hands of the operator are held somewhat differently, depending on the place where they are applied. Between the shoulders, the back of the forefinger nail, steadied by the thumb, as seen in Fig. 38, is used, because otherwise it is very difficult in this position to give a good friction.

Below and above this point, the palmar surface of the last

phalanx is worked with. The direction of the friction is obliquely from below, upward or outward, or the reverse—as, for instance, if the patient lies on his back, and has the frictions after general pétrissage of the abdomen. For the general treatment of these nerves both hands are used at the same time (one on each side), and we generally pass up and down the back three or four times, pausing here and there over places that may be painful, and consequently need more special manipulation.

One ought not to pass carelessly up and down the back, or discard frictions in this region without full trial. It must be remembered that every pair of sensory nerves, springing as they do from the posterior primary divisions of the spinal nerves, may be regarded as being each in connection with its own segment of the spinal cord, while we must also bear in mind the intimate relations between the spinal nerves and the sympathetic ganglia. Indeed, it is found that in patients with heart disease or acute affections of the lungs, the region between the shoulders is very sensitive, and the effect of continued frictions extremely beneficial. I do not wish to be considered as saying too much before others have had the same experience, but I have, and my brother before me, treated cases of pneumonia with nerve frictions between the shoulders and vibrations on the thorax for the lungs, nerve frictions in the neck and over the dorsal sensory nerves for the fever and headache, and pétrissage of the abdomen for the circulation generally, without help of medicine, and have always succeeded. Any one who has some little knowledge of the treatment, may easily obtain confirmation of the fact that the sensory nerves on the side corresponding to the diseased lung respond very painfully indeed, while on the other side frictions give very little pain.

In disorders of the liver, we find tender places corresponding to the lower angle of the scapula on the right side. I may give an instance of the effect of stimulation of the nerves in this situation. Doct. Med. Eugen. Gruber, surgeon in the Imperial Austrian Navy, had a patient who suffered from biliary calculus. The patient had had several attacks, during which the pain had been reduced by injections of morphia. Some little time ago these attacks returned; the patient was again obliged, as heretofore, to take to her bed, and suffered

very much. Dr. Gruber prescribed, as usual, subcutaneous injections. The pain was not relieved, although two injections were administered. Then he remembered what I had shown, and tried nerve frictions. In the back, as described, he easily found some very tender places. He made frictions over them. They at once produced a strong fit of vomiting, the pain was relieved, and the patient was better.

In diseases of the kidney we have to turn our attention to the lower dorsal nerves. When the generative organs, the bladder, and the rectum are affected, we also find tender places in the lumbar and sacral regions. There are two places in the lumbar region which respond very readily to frictions, viz., just below the twelfth rib, at the angle formed by it and the deeper muscles of the back, and at the base of the spine, where an angle is formed by the same muscles and the crest of the os ilium.

A lady, 27 years old, married, no children, had from the very first suffered agonizing pain at each menstrual period. The pain set in two or three days before the catamenial flow began, and continued throughout the whole period, leaving her completely exhausted for several days. During the attack she was confined to her bed, and could often not lie down, but was obliged to sit up, and she was able to obtain very little sleep. The abdomen—especially its lower part—was painful to the touch. The patient had become anæmic, weak, and nervous.

The special treatment applied was nerve frictions at the upper and lower parts of the lumbar regions and over the sacrum, and vibrations on the lower parts of the abdomen. In addition, some general movements were given.

The treatment extended over three menstrual periods, beginning shortly before one, and finishing a few days after the third.

Her condition had already during the first improved to such an extent that she could come to see me every day. During the second period she had only one attack of pain, and at the third she suffered no pain whatever. The general condition had greatly improved.

If we look at the anatomical arrangement of the nerves, it gives a possible reason for these conditions. The sympathetic ganglia in the neck have communicating branches

with all the cervical spinal nerves, and each ganglion gives a nerve to the cardiac plexus. In the dorsal region the sympathetic ganglia all communicate with the corresponding spinal nerves, and the upper five ganglia send branches to the thoracic viscera, through the medium of the cardiac and pulmonary plexuses; while from the sixth to the tenth dorsal ganglia, branches unite to form the great splanchnic, which passes to the semilunar ganglia of the solar plexus. The tenth and eleventh ganglia give origin to the small splanchnic, which joins the solar and renal plexuses; and from the twelfth ganglia arises the smallest splanchnic, which enters the renal plexus.

The same intimate connections also exist between the sympathetic and the lumbar and sacral spinal nerves.

Reflexly, we ought then to be able to react on the organs supplied from the different sympathetic plexuses, as well as to relieve pain in the corresponding sensory nerves.

Over the sacrum the same position of the hand is used as between the shoulders; or the hand is lightly closed, and we work with the knuckles. The nerves here should always be stimulated after the shaking and vibration movements in derangements of the pelvic organs.

We should not forget, in general nerve treatment of the back, to follow the crest of the os ilium, and to give frictions where the topographical anatomy teaches us that the sensory branches of the last dorsal nerve, ilio-hypogastric nerve, and upper lumbar nerves pass downward. When the frictions are correctly made, *i.e.*, a little obliquely, these nerves respond readily.

NERVES OF THE LOWER EXTREMITY.

NERVUS ISCHIADICUS MAJOR.

This is far the most important nerve in the lower extremity. It emerges, as we know, through the great sacro-sciatic foramen beneath the gluteus maximus, and lying nearly midway between the great trochanter of the femur and the tuberosity of the ischium, it passes straight down the back of the thigh to the popliteal space.

The patient is placed in the prone position, as shown in Fig. 5, and the foot of the leg to be treated is crossed over the

other. We have here a position in which we can manipulate all the nerves on the back of the limb most readily, because all the muscles from those of the gluteal region down to the calf are more or less relaxed.

If we wish only to stimulate the nerve in a general treatment, and when there is no particular pain, then a few quick frictions should be made over the nerve, while we follow its course upward and downward. I must repeat here, what I have said before, that care must be taken not to make the friction before one is well down upon the nerve, or feels it, as in the popliteal space. On the other hand, if we have to do with a patient who suffers from such a complaint as sciatica, it is better to put the last phalanx of the thumb over the nerve where it emerges from the pelvis, and to make vibrations there. In recent cases of sciatica I have treated, I proceeded in this way, and the consequences for the better were really remarkable. In order to take the vibrations on their own merit, I gave nothing else at the beginning. Not only did the pain diminish and nearly disappear after my first treatment, but the improvement was sustained; and where the patients had been racked with pain day and night, they obtained rest and could sleep.

In the popliteal space, at its upper part, the nerve divides into the internal and external popliteal nerves.

The internal, passing as it does right through the popliteal space, is easily felt, and there is little or no difficulty in applying frictions to it. When it passes down into the calf as posterior tibial, and is covered by the large muscles of that region, we must take care that these move with our fingers. Behind the internal malleolus, it lies with the artery quite superficially, between the tendons of the flexor longus digitorum and flexor longus hallucis. Frictions over the nerve in this position give the same tingling feeling as when the "funny bone" is struck. By slightly stretching and inverting the foot, we can follow the nerve to its division into internal and external plantar nerves, where strong frictions produce marked pain.

The external saphenous nerve lies superficially in the middle line of the calf. As it is a sensory nerve, we pass from below upward, while giving light vibrations.

The external popliteal is best found behind the head of the

fibula, and frictions at that spot often produce a sparkling feeling in the foot.

NERVUS CRURALIS ANTERIOR.

We can easily find this nerve where it lies in Scarpa's triangle, and apply frictions to it. Passing from it downward and toward the inner side of the thigh and knee, is the internal saphenous, which is purely sensory, and is therefore more effectively acted upon by vibrations in the centripetal direction.

NERVUS CUTANEUS EXTERNUS.

Sometimes neuralgic pains are felt in this branch of the lumbar plexus. We find the nerve about an inch below the anterior superior spine of the ilium.

NERVUS OBTURATORIUS.

In order to affect this nerve, we must flex and somewhat adduct the thigh. It passes out of the thyroid foramen at its upper border, and we must try to find it there.

SENSORY NERVES ON THE FOOT.

Coming forward below the external malleolus, we can easily follow the external saphenous, as it goes about half an inch or more above the outer edge of the foot.

The other sensory branches on the dorsum of the foot are derived from the external cutaneous and the terminal of the anterior tibial, the latter emerging between the first and second toe. We can stimulate these by simply passing quickly with the back of the nail transversely over the surface.

NERVES OF THE UPPER EXTREMITY.

We can reach all the chords of the brachial plexus either just above the clavicle at the base of the posterior triangle of the neck, and make frictions from before backward, or we may abduct the arm slightly, and pass our fingers high up into the axilla, and manipulate them there.

NERVUS CIRCUMFLEXUS.

The nerve passes through the quadrilateral space formed by the two teres muscles with the humerus and the long head of the triceps muscle, and, diving below the deltoid, it comes round the neck of the humerus. The arm is slightly abducted. We feel for the head of the humerus in the axilla, and ascertain the exact situation of the neck of the bone. The fingers are held as shown in Fig. 38, and the frictions are made from above downward, the same precautions as regards intervening tissues being taken here as elsewhere.

NERVUS MEDIANUS.

How this nerve is found I have already described (page 616). We can easily follow it in its whole course in the upper arm;

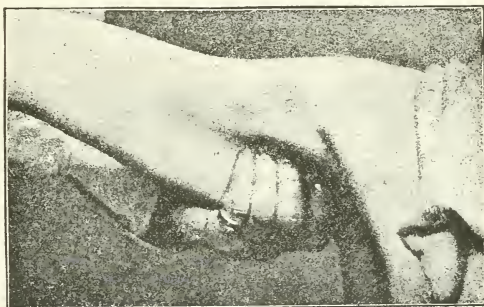


FIG. 42.

but in trying to reach it below the bend of the elbow, we must flex the arm somewhat, as the strong fascia in front of the elbow prevents us from coming down on it.

It lies to the inner side of the biceps muscle, being separated from it by the artery. The tips of the fingers are placed just inside the tendon, and the friction made from without inward.

NERVUS MUSCULO-SPIRALIS.

The place to find this nerve is where it emerges from under the outer head of the triceps muscle and in its course down between the brachialis anticus and the supinator longus (Fig. 43).

It is necessary first to abduct the arm, and then to somewhat flex the forearm toward the upper, because otherwise we are unable to find the nerve, if our patient is a little mus-

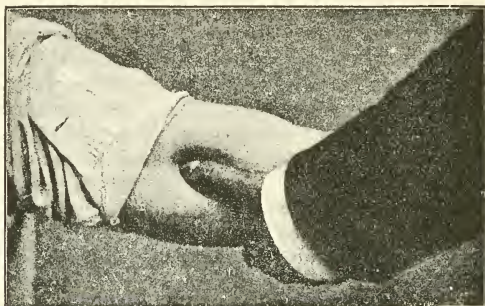


FIG. 43.

cular. The frictions are best made with the last phalanx of the thumb. The feeling of tingling which the patient perceives in the thumb, and even on the back of the hand, indicates a correct friction.

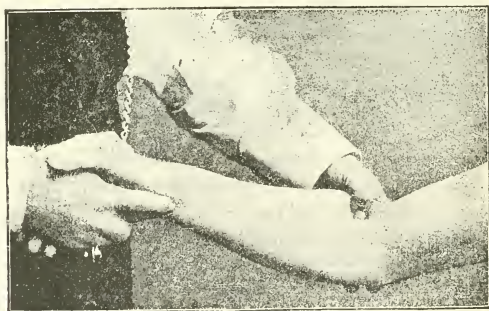


FIG. 44.

NERVUS RADIALIS.

This branch, the sensory continuation of the musculo-spiral nerve, may be acted upon just below the bend of the elbow.

The arm is bent in order to relax the supinator longus muscle. The last phalanx of the thumb is placed at the inner border of that muscle and insinuated a little underneath it (Fig. 44).

At the same time as we quickly pronate the patient's forearm, we make the friction outward with the thumb. This goes under the muscle and over the nerve.

NERVUS POSTERIOR INTEROSSEUS OF THE MUSCULO-SPIRALIS.

We must first find the head of the radius. About an inch lower down, and between the radius and ulna, friction or pressure produces distinct strong pain, which is felt down to the wrist.

NERVUS ULNARIS.

We must feel for this nerve where it lies in the groove behind the internal condyle of the humerus. The high bony

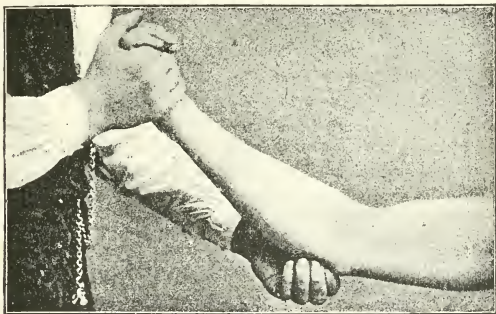


FIG 45.

edges here somewhat prevent the application of a good friction. Therefore I always give it just underneath, where the nerve lies quite free (Fig. 45).

In this case it is also better to bend the arms slightly. The tingling in the little and the ring fingers corresponds in this, as in the other nerves of the arm, exactly to its distribution.

In the hand we once more meet with the median nerve.

It comes out just below the lower edge of the anterior annular ligament, where the nerve divides into its digital branches, and

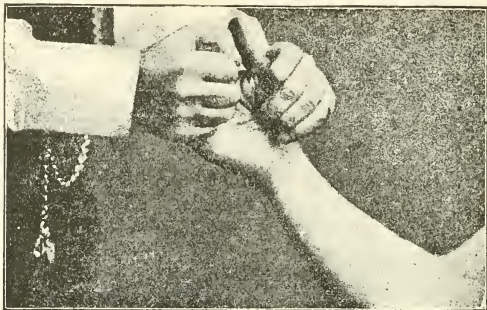


FIG. 46.

sends off the five muscular twigs. The patient's hand must be flexed. Fig. 46 shows how the friction or pressure is applied. It is felt very strongly indeed.

CHAPTER X.

PASSIVE EXTENSION OF THE MUSCLES.

THE passive extension is carried to the natural limit of the muscle, and is a passing, not a continued one. The stretching causes compression of the blood-vessels, while the nerves and the muscles are directly stimulated. After the completion of the movement, there will be an afflux of blood, and, following upon this, brisker nutritive changes. It has long been known that, if a muscle is stretched within certain limits, and not for too long a time, it becomes more sensitive to other mechanical stimulation, and contracts with greater force. In using Ling's exercises, it is therefore generally the custom to precede an active movement with passive extension, and to keep up the extension during the movement. In applying it, it is often found that apparently powerless muscles are capable of reacting against slight resistance, sometimes at once, sometimes after only a short treatment.

This passive extension stands on the borderland between passive and active movements, and at the commencement of treatment in many cases it is substituted for the latter, until strength begins to return in the affected muscles.

The expression "to keep up the extension during the movement" may seem a little extraordinary at first sight, and therefore I will try to explain it.

Suppose we have the movements of adduction and abduction of the upper arm, the patient resisting during the former, the manipulator during the latter. The shoulder-joint is the centre round which the movement takes place; the upper arm is the radius, with the elbow as the terminal point. (The forearm is supposed to be kept bent toward the upper one.) The manipulator, standing behind the patient, grasps his elbow, depresses it and stretches downward at the same time. Of course, in order to be able to do this, he does not hold his own arm at a right angle to that of the patient, but more in the

same line with it. When now the abduction begins, he does not change the respective positions of the arms to each other, or at least very slightly, but makes the resistance not at a right angle, but at a smaller one. The smaller the angle, the stronger is the extension during the movement, and the more are the muscles stimulated to contraction.

There is another reason, and an important one, why we should make it a rule, when the joint is at all affected, to use passive extension in all movements, whether passive or active under resistance. By doing so, we remove the surfaces from each other, the friction is thus lessened, and the movement which under ordinary circumstances would cause considerable pain, can be given without any; it is also greater in range, and no irritation ensues.

CHAPTER XI.

SOME OTHER PASSIVE MOVEMENTS.

THESE movements are rolling (circumduction), extension, flexion at different joints, etc. They are particularly used to diminish stiffness and to break down adhesions, etc., in joints; but it is likewise clear that they will also act more or less on the circulation, in accordance with the position the limb or part of it has while moving, and on the intermittent extension and relaxation of the veins, lymphatics, and capillary vessels in the muscles. Take, for instance, rolling of the leg (Fig. 52). If we make this movement slowly, the blood is gradually pumped toward the heart; but as the rapidity of the exercise increases, the stream quickens, the muscles are stimulated, a greater activity in the tissue interchange is produced, etc., and we have an action nearly as strong as if an active movement were made.

When pain in the joint is present, or if the patient is affected with heart disease, quickness is, of course, contra-indicated, but not otherwise. It is necessary to have the joint at which the movement takes place well under command. This is done either by the position the patient assumes, or by the hands of the manipulator. If not attended to, the movement cannot be well carried out and regulated; it becomes uncertain, and injury may be caused.

As the position of the patient and the application of the manipulator's hands are the same, or nearly so, in passive as in active extensions and flexions under resistance, with the exception of those for the head, I shall describe them along with these exercises, and confine myself here to a few rolling and some general movements for the head.

ROLLING OF THE HEAD.

The patient sits, and the operator stands at the side of him. One hand is placed on the forehead, the other below the

occiput. The head rests in the latter, which is kept nearly immovable, while the former executes the movement. The

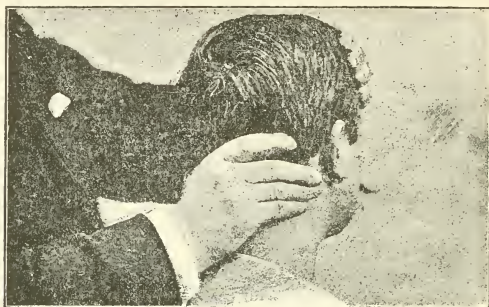


FIG. 47.

hand placed under the occiput confines the movement almost entirely to the occipito-atlantal joint (Fig. 47).

TURNING THE HEAD FROM SIDE TO SIDE, AND BENDING IT FORWARD.

The hands have much the same position as for circumduction (Fig. 48). During the side movements both hands are

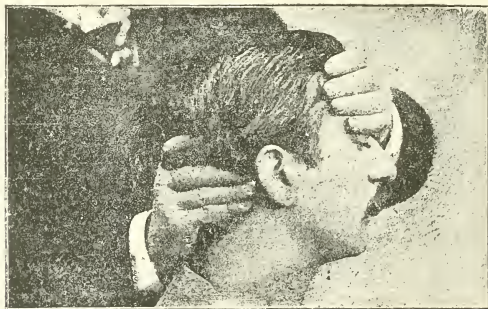


FIG. 48.

equally active, while during the one in the mesial plane, the posterior hand is principally used. Before the head is bent

forward it is slightly inclined backward. In both movements the hand on the forehead makes light vibrations. These help to accelerate the flow of blood from the head.

In all these movements the head is lifted up—well seen in Fig. 48—before the exercise commences.

The object of them is to draw the blood from the head, as well as to diminish stiffness in the neck, as, for instance, from rheumatism. They are preceded by pétrissage or nerve vibrations, as the case may require.

ROLLING AT THE SHOULDER-JOINTS.

The patient sits, while the operator stands behind him, and if the joint is in any way affected, the patient's back is completely steadied.

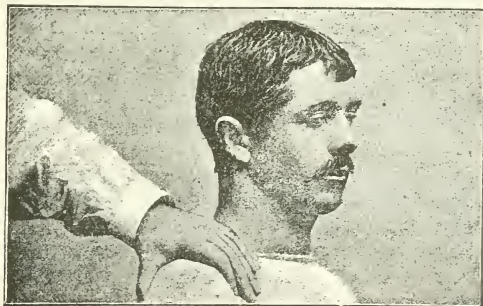


FIG. 49.

One hand is placed on the shoulder, the other below the elbow, as shown in Figs. 49 and 50.

The hand on the shoulder acts as a guard, and we can thus—say immediately after a dislocation has been reduced—give this exercise without any danger of the head of the humerus sliding out again. Then, also, when the bone is to be replaced, we press the fingers or the thumb on its head, and guide it on its course.

The movement may form part of a general treatment. The patient then sits unsupported on a low stool. The

operator places one knee between the shoulders, in order to press the chest forward, and thus produce greater expansion of it, and deeper respiration during the movement.



FIG. 50.

The patient's hands are grasped as in Fig. 63, and the elbows during such circumduction are carried well back. Both arms are rolled at the same time.

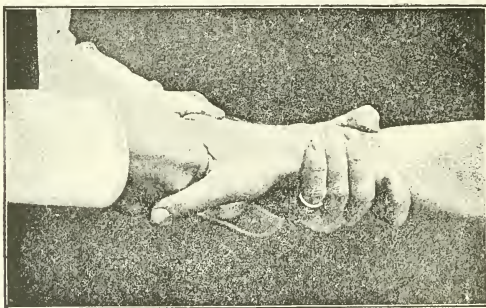


FIG. 51.

ROLLING AT THE WRIST-JOINTS.

The operator, standing in front of the patient, grasps with one hand the forearm just above the wrist, while with the other he takes hold of the patient's hand, as shown in Fig. 51,

which also demonstrates very well the strong extension made before the beginning of the movement.

ROLLING AT THE HIP-JOINT.

The patient lies in the recumbent position, or half so. With one hand we grasp the heel, the wrist and forearm passing along the sole of the foot. The other, which steadies the



FIG. 52.

knee-joint, is placed on the knee, a little to the outer side (Fig. 52)

The hand on the foot executes the movement, while the other acts as a guide.

If the hip-joint alone is to be acted upon, the circumduction need not be so wide in its range; but should we wish to affect the knee-joint as well, or if given for the leg in general, then there must be complete extension at the knee-joint between each individual rolling.

ROLLING AT THE ANKLE-JOINT.

The patient's leg is so placed over the operator's knee, that the ankle-joint comes just over it. If now we grasp the malleoli with one hand, it is clear that we have complete control over the joint. The second hand makes the rolling, having the position on the foot shown in Fig. 53.

Fig. 54 shows where we apply our fingers when passive movements are made at the metacarpo-phalangeal joints. If, instead of taking hold of the forefingers by the first phalanx,

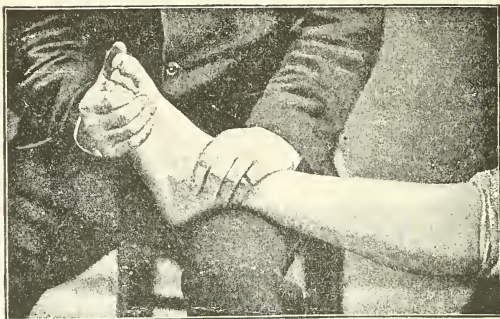


FIG. 53.

we grasped it by the tip, we would then have two intervening joints uncommanded, and this would be a great weakness and disadvantage.

The number of times these movements must be made,

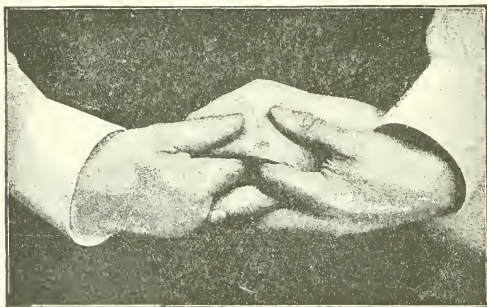


FIG. 54.

varies with the part, and also with the condition of the joints. It will be apparent that we cannot roll the head round as many times as an arm or leg, and the latter not so frequently

in acute as in chronic affections, or when the rolling forms part of a general treatment.

Whenever we use these circumduction exercises, or extension and flexion, we must always carry out each individual movement to the utmost possible limit, exception being made in the instance of the head.

CHAPTER XII.

ACTIVE MOVEMENTS.

“MUSCLES are most perfect machines, but they are distinguished from all machines of human manufacture by the fact that by frequent exercise they become stronger, and are thereby capable of accomplishing more work” (Dubois Reymond).

When a muscle contracts, the veins and lymphatics are necessarily compressed, and more or less emptied, while as soon as the muscle relaxes there is an increased flow of oxygenated blood into it, and in consequence greater nourishment and growth of the existing muscular fibres; and if the contraction is repeated time after time, taking care, of course, that it is always kept within physiological limits, so that the muscle is not exhausted, a development of new muscular fibres takes place.

As a consequence of these two processes, the muscle becomes stronger and capable of doing more work.

All active movements have the effect of building up and strengthening the tissues.

But at the same time that the active movements have a local action, they have also a general influence.

It is evident that, having a given amount of blood in the body, when an increased flow to one part takes place, there must be a corresponding decrease of blood in the other parts of the body. It is for this purpose we use the active movements, viz., to produce metastasis.

As already stated, the active movements may be—

1. Free, *i.e.*, movements executed by the patient without any external help whatever.

2. Bound, *i.e.*, movements made either while steadiness and isolation are secured by apparatus, or under resistance.

Those made under resistance are again subdivided into—

- (a) Those in which the operator resists.

(b) Those in which the patient resists.

The second group of movements, as can readily be understood, may be made to alternate for the same muscles, as for instance in the case of flexion and extension of the forearm on the upper, when the operator makes resistance to the bending and the patient to the stretching of the forearm.

It is necessary, before the commencement of each movement, that the patient should take up a correct position. By that I do not only mean a position in which the exercise can be best executed, but also one in which the chest is free, while deep and steady respiration must be kept up. In the movements, for instance, with the arms, depicted in Figs. 62 and 63, the respiration must be so regulated that deep inspiration is made when the arms are separated from the chest, and expiration when they are again approximated to it, because in the former case the chest is expanded, in the latter its capacity is diminished.

Simultaneously with the quickening of the circulation, a greater amount of blood is sent to the lungs, carrying with it more carbonic acid; and the need for oxygen in the body is greater, thus necessitating stronger and deeper respiration.

Indeed, a correct position is nearly of as much importance as the movement itself.

Every active exercise must be made, or given, slowly, exception being taken in those movements by which we desire, through their very rapidity, to influence the circulation. After the completion of a movement—say stretching of the arms—the patient remains for a few seconds with them in that position, in order that as great an effect as possible may be produced.

We must also bear in mind that the muscular power is strongest at the middle, smallest at the beginning and end, of the movement; and therefore the resistance must be graduated, and must increase and decrease with the increase and decrease of the muscular power.

In the free active movements, there is little or no isolation of the muscles, but in the bound ones we can, of course, localize them as much as we like.

The active movements are usually repeated three or four times.

I now pass on to describe a few of these exercises.

I. FREE.

BENDING FORWARD AND RAISING OF THE TRUNK, WITH THE
ARMS STRETCHED UP.

The patient either stands with his feet together, or he has them apart a distance of twenty to twenty-four inches, as in the illustration, in order to secure a broader base, and with it more steadiness in the movement. The arms are stretched

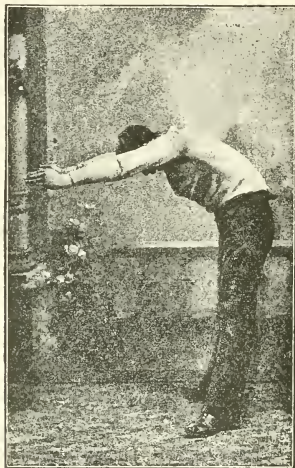


FIG. 55.

straight up, the distance between the hands corresponding to the transverse diameter of the chest.

Before the movement begins, the patient stretches himself to the very utmost, and then he slowly bends forward. The back is not to be kept straight while he does so, because all the segments of the vertebral column then become immovable, and the movement which takes place is from the very beginning greatest at the hip-joint, and we have, so to speak, only a falling forward of the trunk. The exercise must, on the contrary, begin at the upper part of the spinal column, and gradually pass down vertebra after vertebra; and on raising the trunk again, it is at the lower part of the back that the move-

ment begins and passes as gradually upward. In this way the muscular slips of the deeper muscles of the back come fully into play, and they act like so many elastic strings, which, having the weight (the head and arms) at the upper end, and a fixed point below from which their band action starts, must, when the movement goes forward, necessarily extend the spine more completely, and in a case of lateral curvature of the back also rotate the vertebræ. The patient has then to try to keep as much as possible in the mesial plane, in order that the elongated tongues of the relaxed muscles may come more effectively in action.

The patient on rising up does not stop at the erect position, but goes somewhat backward, partly in order to get a deeper inspiration, partly to exercise the abdominal muscles, and in this manner to get equality between the antagonists.

A very simple, but none the less effective respiratory movement is this: The patient stands completely erect, with the arms down to the sides. He now makes the following exercise: He carries the arms slowly forward and upward, always maintaining the proper distance between the hands, and when they are in the vertical position he draws them backward by bringing the muscles of the shoulders more strongly into play. Slowly as they were carried up, they are now taken downward and outward. As the arms are raised from the sides, the chest becomes more and more expanded. The patient has to make deep inspiration while the movement progresses toward its climax, and afterward makes gradual expiration. This movement, when well executed, is felt very strongly in the shoulder muscles. It is therefore also indicated for those whose shoulders have a tendency to fall forward, as well as for chronic disorders of the lungs.

II. BOUND.

A. With Help of Apparatus.

BENDING BACKWARD AT THE UPPER PART OF THE BACK.

The patient stands at a distance somewhat less than the length of his own foot from the wall. He places his hands on his hips, with his elbows well thrown back. Then he stretches himself and bends backward. When the movement cannot be continued any further, the patient falls back until the back

of his head touches the wall by which he stands (Fig. 56). Then he slowly rises up on his toes, and while doing so draws a deep inspiration and goes slowly down again.

The movement does not take place in the lumbar region at all, but higher up between the shoulders. We have to do with movable rings, each formed by a vertebra and a pair of ribs. As now the spinal processes are by the backward bending, small as it is, approximated to each other, the freer segments

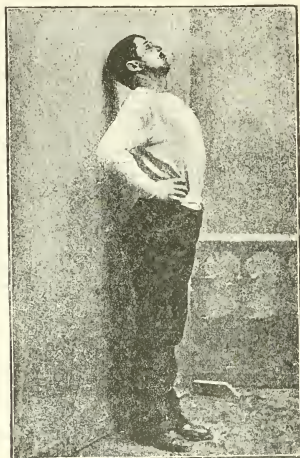


FIG. 56.

of the rings must come further away and widen the interspaces. The chest becomes greatly expanded, and the exercise is thus a powerful respiratory movement.

STRETCHING AND BENDING OF THE KNEE.

The patient places one foot against the seat of a chair, and with his hands he takes hold of the back of it (Fig. 57). The correct position, however, is with the arms straight forward from the shoulders, and with the hands grasping some fixed object at the same level. Why should the arms be stretched horizontally forward? Because the patient then stands erect, and we have the normal distance between the two attachments of the hamstring muscles. In Fig. 57 this distance is

increased because of the bending forward. As we see, this may serve as a position in which to give tapotement of the perineum, sacral and gluteal regions. The operator, while giving this tapotement, stands on the opposite side to that of the raised leg. In such a case, therefore, as represented in Fig. 57, he would take up his position on the left side.

When the knee-joint is stiff, he must be on the same side as the affected limb. The patient has to stretch the leg to the

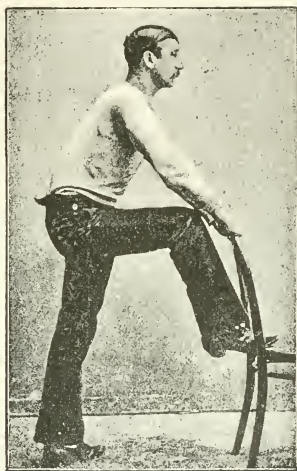


FIG. 57.

utmost of his ability, and when he has reached the limit, we produce a greater extension at the knee-joint by laying one hand on it, placing the other below the buttock, and by drawing backward we extend passively the hamstring muscles, at the same time as the hand on the knee presses it down. I have often seen a knee stretched completely straight, where from stiffness in the muscles the patient himself was entirely unable to effect this movement.

The patient keeps it extended for a little, and then he bends it until thigh and leg are at least at right angles to each other, and complete relaxation of the muscles is produced. Sometimes, of course, we must begin with the foot, quite low down at the floor, and gradually work upward as the patient

improves, until he can straighten his knee, when the foot is placed at the same height as the hip-joint.

The action on the muscles, blood-vessels, and nerves on the posterior part of the thigh and leg—particularly on the former—is very great. The effect of the movement, especially on the muscles of the calf, is much increased by depressing the heel after the knee has been extended.

The limb on which the patient stands must be kept completely straight, otherwise the exercise loses a good deal of its effect.

This movement is more especially used in contraction of the hamstring muscles and those of the calf, stiffness and other affections of the knee-joint, in sciatica, and also for the general circulation.

EXTENSION OF THE MUSCLES OF THE CALF.

If, standing with the legs straight, we make strong dorsiflexion of the foot, the muscles of the calf are extended, and

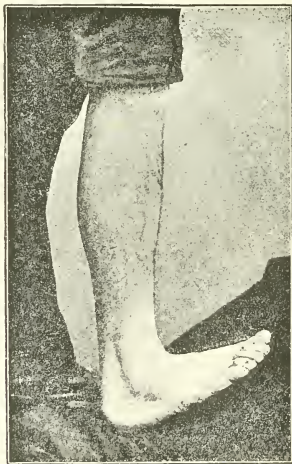


FIG. 58.

the movement goes on until it is stopped, partly by the wedging of the astragalus between the malleoli, and partly by the

band action of the muscles of the calf. We can increase the intensity of this movement by placing the foot against, say, a wall at an angle of 45° , or on something situated at the same angle, and then with straight knee moving the whole body forward (Fig. 58). The extension is felt very strongly in the muscles of the calf. If the knee is bent, the movement loses its effect, because the points of attachment of the muscles become approximated to each other.

The movement is mostly employed for muscular and nervous stimulations, and for stiffness in the ankle-joint.

RAISING OF THE LEGS OR TRUNK WHILE LYING ON THE BACK (Figs. 59, 60).

We have here two movements shown in full action, in which the psoas and iliacus muscles take the principal part,

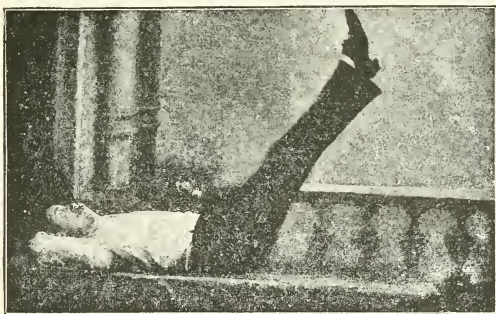


FIG. 59.

but in which the muscles of the lower extremities are also at work—only the fixed point is reversed. The primary position for the patient is to lie straight on his back. In Fig. 59 he lifts the legs up to a right angle or more. In Fig. 60 he gradually raises the trunk until he attains a sitting position. In the exercise depicted in Fig. 59 we sometimes steady the patient by laying our hands on the elbows, while in the raising of the trunk the hands grasp the ankles; and in both we isolate the psoas and iliacus muscles by deep abdominal respiration.

That full respiration is necessary we can readily understand, for the muscles of the lower extremity are more or less in action, keeping the knee and ankle steady, so that the psoas and iliacus may have an immovable attachment from which to start their action. In doing so, they for the time compress the vessels, and the blood is largely driven out of the limbs. If now, as so often happens, the patient holds his breath, the blood does not pass so well into the lungs, and the abdominal muscles adding their pressure, the right side of the heart gets overfilled with venous blood. Thus we have also backward pressure in the vessels of the head and neck.

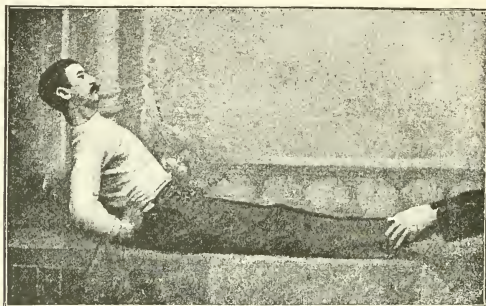


FIG. 60.

The movements are made very slowly, and in both we make the patient stop at different angles to the plane in which he lies. This greatly increases the muscular work.

We can, in the movement shown in Fig. 60, augment the work by folding the hands behind the neck, and again by having the arms stretched straight up. The patients, when they begin to feel tired of continuing the exercise, have a habit of drawing the shoulders forward and thus pressing the chest together. This is on no account to be allowed.

These exercises are to be used in weakness and pain in the lumbar region. They also act on the organs in the abdominal cavity.

In the position the patient occupies in Fig. 59, a movement acting on the adductor muscles of the thigh can easily be made simply by letting the legs slowly fall outward as far as

possible from one another, and then by as slowly approximating them again.

EXTENSION OF BACK IN THE PRONE POSITION.

In Fig. 61 we see a movement which acts especially on the muscles of the back, but also on those on the posterior aspect of the lower extremity. The patient lies in the prone position, with the hands steadied at the hips, the fingers forward and the thumbs backward. If they are reversed, they necessitate the carrying forward of the shoulders, and with that compression of the chest. On the contrary, the shoulders are to be

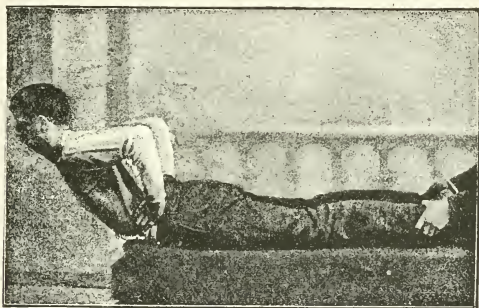


FIG. 61.

well thrown back and deep inspiration made, as it is not only a movement for the back, but, secondarily, also for the chest.

It is used after tapotement of the back, or alone as a muscular stimulation, and in a general treatment.

As the patient gets accustomed to the exercise, the hands are applied to the neck, or extended straight forward parallel with the ears.

B. Made under Resistance either from Patient or Operator.

BENDING AND STRETCHING OF THE NECK.

The patient stands quite erect, with his hands steadied against the wall of the room. The operator places his hands well below the base of the patient's head, having the thenar part of the palm on each side behind the mastoid process, and

the thumbs lying horizontally under the occiput. The patient now makes resistance while the operator bends the head forward, after having first well stretched the neck (Fig. 62). When the movement reaches its anterior limit, the patient in his turn raises the head, the manipulator making resistance.

Through this movement the muscles of the back of the neck in general are affected, but the influence of its action is also felt at the upper part of the back. If we wish to isolate the movement to one side of the neck, say for instance in rheumatism of the right side, the patient turns his face to the



FIG. 62.

right and inclines it backward. We then use only one hand, and place the other on the opposite side to act as a guard during the manipulation.

CARRYING THE ARMS FORWARD AND BACKWARD IN THE HORIZONTAL PLANE.

The patient may sit with his back steadied or stand free. He extends the arms forward, with the normal distance between the hands. If he stands, he must place one foot forward, the length of an ordinary step, for security of the position. Made in this way the movement is considerably stronger. The operator standing in front of him places his hands as in Fig. 63.

The patient carries the arms back under resistance, and resists himself when the arms are brought forward by the operator.

As we see from the course of the movement, it acts more especially on the muscles passing between the shoulder-blades and the humerus, but since the rhomboid and trapezius muscles, starting from the spine, are nearly as much exerted in order to give the other muscles a steady point to work from, the action of the movement has a marked influence upon them too.

Made with both arms at the same time, it is distinctly a



FIG. 63.

movement for the chest, by its action of drawing the shoulders back, and by that of lifting up the thorax. Made with one arm at a time, correction of the rotation in lateral curvatures of the spine is produced.

STRETCHING AND BENDING OF THE ARMS.

The patient sits on a low stool. The operator places his knee against the patient's back between the shoulders, partly to steady him, partly for expansion of the chest. Fig. 64 shows the grasp of the hands, the turning out of the elbows, and consequent throwing back of the shoulders. The patient stretches the arms straight up and draws them down again, the operator making resistance on both occasions.

At the same time that it is a movement for the arms, it also affects the chest by producing greater expansion.



FIG. 64.

STRETCHING AND BENDING AT THE ELBOW-JOINT.

The patient sits or stands. With one hand we grasp the elbow, in order to command that joint, and with the other the hand and wrist, as seen in Fig. 65.

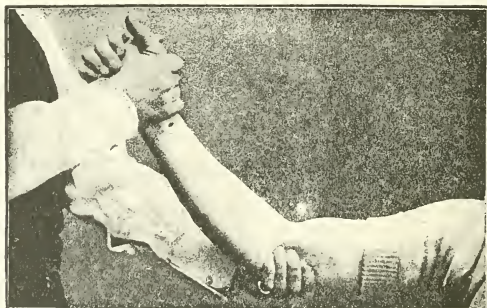


FIG. 65.

Here the movement is shown with the arm midway between supination and pronation, in order that the supinator longus muscle may more particularly be put in action. We make the resistance both at the bending and stretching, or the patient makes the resistance in both movements.

Used for stiffness of the elbow-joint, muscular stimulation, etc.

STRETCHING AND BENDING AT THE KNEE-JOINT.

The operator places the patient's knee above his own thigh, and lays one hand over that joint, and the other over the



FIG. 66.

dorsum of the foot (Fig. 66). The patient extends and flexes his leg, while the operator makes resistance. During the flexion of the limb, the hand on the dorsum of the foot is placed behind the heel and ankle-joint.

STRETCHING OF THE VERTEBRAL COLUMN.

I cannot remember having seen this movement used in Stockholm, but my brother always employs it in curvatures of the spine.

The patient stands as erect as possible, with his back against the wall of the room (Fig. 67). The operator stands in front of him, and lays one hand on the patient's head, while with the other he steadies him. (The left hand in the figure is somewhat awkwardly placed.) He now presses downward, at the same time that the patient is told to stretch upward with all his might. The top of the column being thus fixed, the short deep muscles at the upper part of the back take

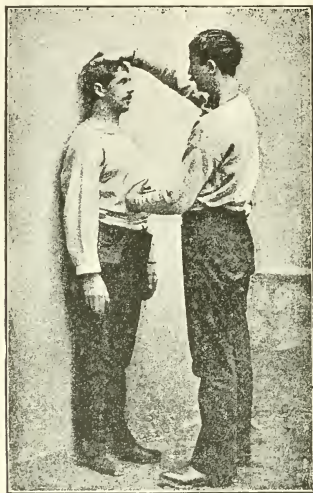


FIG. 67.

their steady point above, and so act from above downward while the lower ones work from below upward.

In a case of spinal curvature, the slips of the deeper dorsal muscles, which have become weakened and elongated, are thus brought into action. We must take care not to bend the head forward during the exercise, as the movement then entirely loses its effect, because the fixed point above is moved.

TURNING OF THE TRUNK IN THE SITTING POSTURE.

The patient sits on a low stool. Either he must have the feet fixed by some means, or an assistant must steady his

knees; otherwise the movement is not confined to the trunk. He has the hands folded behind the neck, sits with his back completely straight, and with the head well back. The operator applies his hands to the patient's elbows (Fig. 68).

The movement now begins, the patient turning toward either side (the left in the figure), and resistance is made by the operator with the left hand behind and the right one in front. This resistance must be equal on both sides. When

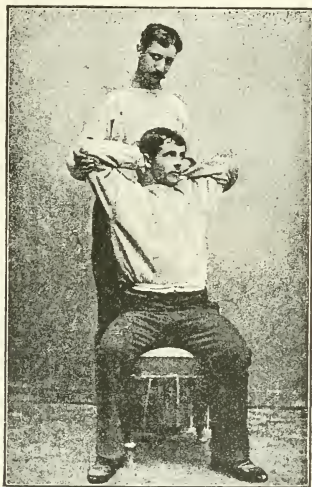


FIG. 68.

the patient has gone round as far as he can, he turns forward again, also under resistance, which, however, has changed, being in front on the left side and behind on the right. When he again sits with the face straight forward, a few seconds' rest is made, and the same repeated on the other side.

If we recall the arrangement of the muscles of the trunk, we shall understand how wide the effect of this exercise really is. Starting below at the crest of the ilium on the right, the fibres of the external oblique of the abdomen pass upward and backward. In the region of the thorax this same direction is maintained by the external intercostal muscles; still further

back there is a similar arrangement in the short fibres which constitute the great oblique rotator muscles of the spine; and we must also remember that in front we have the internal oblique and internal intercostals on the left side whose fibres run in the same direction as those of the external muscles of the right.

Besides using the exercise for circulatory purposes and for the muscles, we have recourse to it in different intestinal affections.

It will be clear that we can also give passive movements to the patient going in the same direction and with the same application of the hand, in all the above positions, except the stretching of the back.

LIFTING OF THE LEG WHILE LYING ON THE SIDE.

In Fig. 69 we see the position the patient takes up before the exercise begins. Fig. 70 shows how the movement is made under resistance. The operator stands with his side

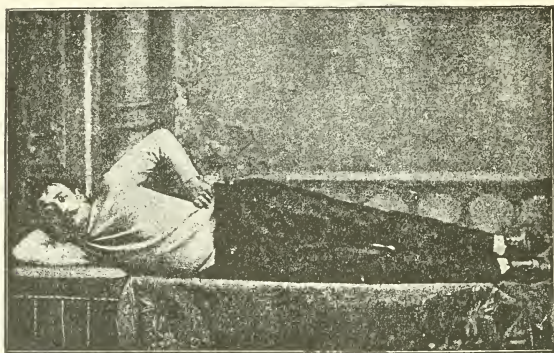


FIG. 69.

against the patient, steadying him at the gluteal region. With one hand he grasps the heel and ankle in such a manner that the thumb lies parallel to the outer border of the foot. The other hand is placed on the knee. The patient, holding the leg completely straight, lifts it slowly up in the middle line

as high as he can, while the operator makes resistance. The latter afterward presses it down, the patient resisting. If we

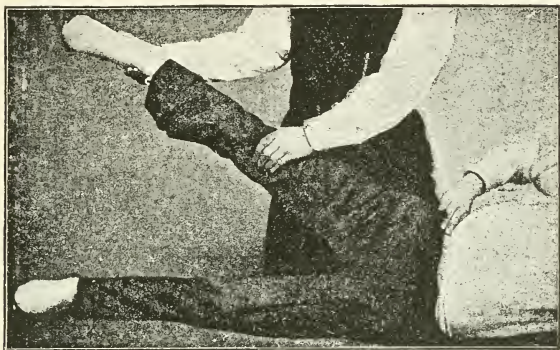


FIG. 70.

carry the foot a little backward or a little forward, we bring the anterior and the posterior parts of the muscular mass in the gluteal region into play to a greater extent.

ABDUCTION OF THE KNEES (Fig. 71).

The patient lies in the semi-recumbent position, the knees being bent and the feet resting at the same level as the buttocks. The operator stands in front of the patient, and places one hand on the outer side of each knee. The patient abducts the thigh under resistance from the operator, and the latter afterward adducts the knees while the patient resists. In this way the abductors of the thighs are strongly acted upon. One must stand in front of the patient in order to produce extension of the muscles.

In the same position the adductor muscles of the thighs can also be exercised if resistance be made on the inner side of the knees when they are approximated to each other, or if the operator adducts the knees, the patient making resistance.

The intensity of the movements is increased when the patient sits on a high bench with the back steadied and the legs stretched out. The operator's hands are then applied on

the feet instead of the knees. The increased length of the lever increases the muscular work for the patient, while at

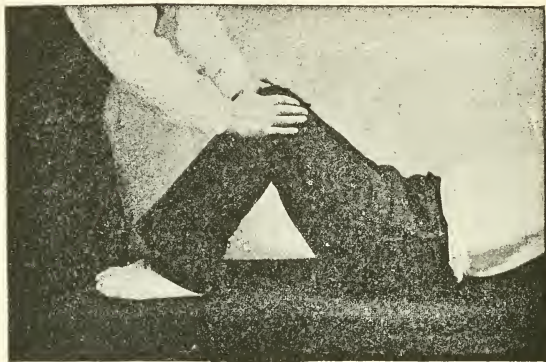


FIG. 71.

the same time it lessens the force necessary to be exerted by the operator.

CHAPTER XIII.

CASES ILLUSTRATING THE TREATMENT.

I. PAROTITIS BILATERALIS.

ARTILLERYMAN N. was taken under treatment on the 17th of December, 1888.

The parotid glands on both sides were swollen, the swelling extending from the zygomatic arch to below the lower jaw. They were hard and painful, and had the size of a hen's egg. The pain was so great that the patient was unable to open his mouth. Hearing impaired. The illness commenced on the previous day.

Progress.—After about twenty minutes' treatment, the glands sank to within a third of their former volume, and were soft.

December 18th. Pain and swelling less than after treatment the day before.

December 19th. Hears well again; no pain, no swelling; movement of lower jaw painless and free.

Treatment.—Pétrissage. The pressure was applied in a half circle, from above backward and downward. I stood behind the patient, and used the ball of the thumbs, in order that no unnecessary pain should be caused. The pétrissage did not act quickly enough, and therefore vibrations were made with the same parts of my hands, which had a greater effect in diminishing not only the pain, but also the swelling. I also gave frictions over the facial nerve for about a minute.

II. TONSILLITIS.

Rinaldo N., 22 years old, non-commissioned officer of the I. and R. Navy, came for treatment on the 11th December, 1888.

Both tonsils began to swell the day before. They were now covered with pus. On the right side, the pus coverings extended over wide areas, while on the left side they formed

several smaller points. The tonsils themselves were very swollen, and difficulty and pain were experienced in swallowing.

Progress.—After the treatment the patient felt better. The difficulty of swallowing was greatly lessened.

December 12th. Tonsils much smaller. The pus coverings have disappeared on both sides.

December 13th. The tonsils are very nearly normal. No difficulty or pain in deglutition. Treated for the last time.

Treatment.—The patient was subjected to treatment for fifteen minutes each day. It consisted in the two movements for the throat shown in Figs. 20 and 23, the former for five, the latter for about ten minutes, and frictions over the facial nerve separately; but it is clear that the manipulation behind the ascending ramus of the lower jaw stimulates the nerve the whole time, since the fingers pass over it continually.

III. TONSILLITIS.

Rezie, 28 years old, maid-servant, residing at Trieste, had taken cold on the first day of her menstrual period, the 22d of January, 1889. On that day and during the night, fever, with shivering, difficulty of and pain in swallowing, set in. She also suffered from a severe headache.

She was under the care of Dr. Michele Brown, the distinguished specialist for diseases of the nose, throat, and larynx.

I myself was under his treatment at Trieste. He mentioned the case to me on the morning of the 23d, and asked if I would treat her, and thus illustrate to him the way in which I gave the manipulations for the throat.

The patient's temperature was 39° C. She shivered and felt cold, and had great pain in swallowing; both tonsils were inflamed, each with a continuous white covering, more especially on the right side. The skin was dry and hot, the head ached very much, and the lymphatic glands were enlarged.

Progress and Treatment.—January 23d. I gave the shakings as shown in Figs. 20–23 for about five minutes each, and the pain and difficulty of swallowing passed nearly away; also frictions for three minutes in the neck, more particularly over the second pair of cervical nerves. The patient felt the cold sensation, which nearly always accompanies administration of these frictions, very strongly. The shivering ceased,

she turned warm, and the skin moist. This was followed by general pétrissage of the abdomen.

In the evening at six o'clock the temperature was 38.6° C.; pulse, 132. Same treatment as in the morning. The pulse immediately went down to 96. She now also told me that she had severe pains in the sacral region, and that she had had them very strongly at the menstrual periods since the time, six months previously, when she had a child. I gave nerve frictions over the sacrum, with the consequence that the pain entirely passed away.

January 24th. Not treated in the morning. The pain on swallowing had diminished considerably. Up to ten o'clock the evening before, she had felt well, but at that hour the fever set in again.

Dr. Brown took the temperature an hour after the treatment the preceding night, and found it normal. This sudden effect astonished him, and he asked Dr. Escher and Dr. Gormond, the former surgeon and the latter physician to the Infirmary at Trieste, to be present at my next visit. We decided to treat the patient in the evening only at six o'clock.

The pulse had again risen to 122, and the temperature was 38° C. I gave the same treatment as the day before. The pain in the throat went entirely away. I gave the nerve frictions in the neck for two minutes. Dr. Escher and Dr. Gormond each took one hand, and felt the pulse during the frictions. They said that at first it changed, being sometimes slower, sometimes quicker, then it got more even, and at the expiration of the two minutes it went comparatively slowly, at the rate of 90 beats a minute.

An hour afterward the temperature was again normal. The patient felt easy and well; the pain at the small of her back remained away.

January 25th. The patient was well. No discomfort on swallowing. Tonsils no longer inflamed; the coverings gone. Temperature normal; pulse, 72. Treated for the last time.

IV. DIPHTHERIA.

Private Ine F. turned ill on the 10th of December, 1888, and was the same day removed to the Marine Infirmary.

On the 11th, at four o'clock in the afternoon, I saw him for the first time.

The tonsils were very much swollen—the right one most; they nearly met in the middle. The right tonsil was covered with a large gangrenous membrane; on the left the covering was smaller. The lymphatic and submaxillary glands were enlarged, especially on the right side, where they formed a large continuous swelling. Deglutition extremely painful. Temperature, 39.6° C.; pulse, 104.

Progress.—The treatment was begun at once. The swelling of the glands diminished visibly, and they turned softer. 9 P.M. The diffuse swelling is soft and œdematous. The patient complains that the sputum and fluids he drinks pass out through the nose. He keeps the mouth very open. Temperature, 38.7° C.; pulse, 92.

After the treatment the external swelling had nearly disappeared. Expectoration easier; he closes the mouth, and says he feels better.

December 13th. Morning temperature, 37.7° C. The swelling of the tonsil on the right side diminished, and the membranous covering smaller; the left side is also clearer.

December 14th. Membranous covering continues to diminish. Temperature, 37.3° C.

December 16th. Deglutition easier, but the fluids still pass out of his nose on drinking.

December 17th. On left tonsil the covering loosens; the tonsils much smaller; lymphatic glands normal.

December 20th. Pharyngeal surfaces normal. Patient well and convalescent.

On the 30th, the patient left the hospital, and went on three weeks' leave. He came back from this with paralytic symptoms. These spread, bulbar paralysis set in, and on the afternoon of the 2d of February, 1889, the patient died from paralysis of the heart—the very day I returned to Pola after a five weeks' absence.

V. DIPHTHERIA.

The girl Papic, 8 years old. On the 9th of December, 1888, the tonsils were red and swollen, and had a membranous covering.

December 10th. Membrane on both tonsils. Fever; glands swollen.

December 11th. The membranous covering spreading.

Progress.—December 12th. She came under my hands. The temperature, 37.7° C.; pulse, 110. She keeps the mouth open; breathing snoring, expression of face quiet. The tonsils very swollen, especially the left one, so that they nearly meet. The membranous covering passes on to the soft palate. The nose is free. On the left side the lymphatic glands are as large as hazel-nuts, on the right as almonds; the submaxillary glands are swollen—all are tender.

Evening, nine o'clock. Temperature, 37.4° C.; pulse, 92. Treated both in the morning and evening for about 20 minutes.

December 13th. Yesterday the membranous coverings were brushed away with lactic acid. To-day they are more continuous and thicker, and are spreading forward on the left side; on the right side, the covering shows on separate places. Since yesterday, the fluid she drinks passes through the nose. The glands on the right side are larger; on the left, œdematous swelling is present, especially in the submaxillary region.

Evening. Temperature, 37.6° C.; pulse, 102. During the treatment a great amount of saliva flows out of the mouth. After it, the girl feels easier, the glands are softer and smaller.

December 14th. Slept fairly well during the night. Morning temperature, 37.7° C.; evening, 37.8° .

December 15th. Evening, ten o'clock. Temperature, 37.6° C.; pulse, 108. Breathing very snoring. Nose is clogged up. Expression of face apathetic. Membranous covering on right side as before. On the left, it spreads thickly over the whole tonsil, over the soft palate and on to the uvula.

The pulse intermits sometimes (every fifth or sixth beat); is very small.

The breathing occasionally stops. After thirty minutes' treatment, the pulse was quieter and was regular; same with the respiration.

December 16th. Forenoon. Temperature, 36.7° C. Slept a little during the night, but snored very much. From the nose a great amount of thick stuff came out. Expression of face quiet; she takes an interest in the surroundings. Breathing free; the nose free.

Membranes on right side thrown off. Tonsil on the left less swollen; membrane contracted and lessened, split in the middle and at several places. The glands are much smaller. Treated 20 minutes.

December 17th. Morning. Temperature, 37° C. Slept well; no snoring after two o'clock. Perspired slightly during the night. Left tonsil free at the front; left palate near it the same; the covering on uvula loosens, same posteriorly; right tonsil clear.

Evening temperature, 37° C. Treated 25 minutes.

December 18th. Has slept well; plays and takes food with appetite. Temperature, 37.2° C. The membranous covering only present as small islands. The lymphatic and submaxillary glands are normal.

December 19th. Slept well. Œdema of the right inferior eyelid. Albumin in urine, 1%. Quantity of urine small. General condition yet continues good; she plays. Treatment 35 minutes. Œdema gone.

Evening. No œdema. The child plays and laughs.

December 20th. The remainder of the membrane on left side hangs free as a sail from the tonsil. Temperature, 37.6° C. Treated 35 minutes; the throat, 15 minutes; back and abdomen during the rest of the time.

December 21st. Urine has 1% albumin. Membrane completely gone. Treatment as before.

December 22d. Urine still contains albumin. Throat treated 10 minutes, with pétrissage of the abdomen. I also gave vibrations over the kidneys.

December 23d. Urine contains albumin in the proportion of about 1 to a thousand. Quantity greater. Child looks well.

December 24th. Quantity of urine about normal. Traces of albumin scarcely discernible.

Here I stopped the treatment. On the 6th of January, 1889, the patient was sent home.

Treatment.—The treatment is here the same as for angina (tonsillitis), only vibrations are at the beginning substituted for shakings, and the latter must be made much more delicately. The nerve frictions in the neck are continued for some minutes. The whole is to be concluded with general pétrissage of the abdomen, accompanied by nerve frictions over the dorsal sensory nerves.

In the case of the girl Papic, I gave on the first days of the appearance of albumin in the urine kneading of the kidneys. On the 22d I gave vibrations instead, and on the following day

the quantity of urine was increased and the albumin diminished. The treatment in both cases lasted from twenty-five to thirty-five minutes, and the patients were treated twice a day.

VI. POST-DIPHTHERITIC PARALYSIS.

I treated the following case during the summer of 1887, at Leipsic, in the clinic of Dr. Moebius, the well-known authority on nervous diseases; and I have already recorded it in the medical press ("Medical Press and Circular," July 25th, 1888).

Mary A., aged 15, a native of Leipsic, was seized with diphtheria in the second week of December, 1886, and was for four weeks confined to her bed. On several occasions she was nearly choked, and her mother probably saved her life by tearing away large pieces (*grosse Stücke weggerissen*) with a spoon. A young member of the family, a boy, three years old, died of diphtheria at that time. The patient's progress toward recovery was very slow. She could not go out of doors until the middle of February, 1887. The soft palate remained paralyzed for a considerable time. Even in May and June regurgitation of food into the nose now and then occurred.

About the middle of May, the patient began to feel weakness in the legs, and consequently difficulty in walking. She was sent into the country, but returned after a fortnight in a worse condition. The weakness increased day by day, until at last she was quite unable to walk without assistance. Her doctor then advised her to consult Dr. Moebius, and she attended his clinic on the 23d of June, 1887. Her condition on that day, shortly stated, was as follows:

The patient looked pale and weak. Her appetite was not good. She was very nervous, and shed tears on the slightest provocation. Sensation in the feet, ankles, and lower parts of the legs was greatly impaired. The weakness in the legs was not preceded or accompanied by any pain. She could only take a few steps without help, and even these in a very waddling manner. She lost her balance in walking, and also when she closed her eyes.

When told to extend or bend her feet, she only succeeded in producing slight movements of the toes. The powers of

flexion and extension at the knee-joint were gone. Adduction of the thighs could be performed with some exertion, while the abductor muscles had almost lost their power. She required assistance to rise from her chair, or while standing with her feet wide apart to bend her body forward or sideways and raise it up again; her inability being due partly to loss of balance, partly to muscular weakness. The patellar reflex was absent. Her sight had been affected, but the power of accommodation was now normal. The voice had a slight nasal twang, and, as said before, regurgitation of food into the nose had sometimes occurred during the month. No electrical tests were tried.

Progress.—From June 23d to July 2d I treated the patient four times. By the latter date the sensation was greatly improved, and there was more strength in the back. The feet had regained some power, but she was still unable to perform the movements of eversion and inversion.

July 9th. The patient had received further four treatments. The sensation in feet and legs was completely restored. She could bend and extend feet and legs even under slight resistance on my part. The power of eversion and inversion was returning. She could walk without assistance, and with a much steadier and less waddling gait. No regurgitation of food had occurred since she came under my treatment.

July 16th. The patient had again been treated four times. On the 14th she walked a considerable part of the way to the clinic without help, and also walked up three flights of stairs, whereas previously she had to be carried up. Her voice had lost the nasal accent, and the general appearance was greatly improved.

July 23d. Treated three times since last report. During the last few days she had experienced some pain in the ankles and knees, because she had passed a good deal of time out of doors. She had also felt a prickling sensation in the throat toward the ears. By the above date these symptoms had disappeared. She could turn round without staggering, and walked well.

August 2d. The patient was treated three times during the preceding week, and on this occasion she had walked unassisted from her home to the clinic, and back again—in all

about an English mile and a quarter. She had regained her strength, and made all the movements well. Those at the ankle and knee-joint were executed with considerable force. She could stand quite steady with her eyes closed. She both looked and felt perfectly well, and could now be considered restored to health.

The patient had no treatment during the week following the 2d August, as I was away from Leipsic. She came again and was treated on the 9th, the 12th, and for the last time on the 16th, when she was dismissed as cured.

The patellar reflex had not returned, but, according to Dr. Moebius's experience, this generally does not appear until some time after the restoration of the muscular power.

On each occasion the patient was treated from half an hour to three-quarters of an hour.

From advices which I received up to the end of 1887, I was glad to learn that the patient continued in perfect health.

Treatment.—Each day of treatment I gave her the shakings for the throat (Figs. 20–23) with frictions over the facial nerve; pétrissage of the legs and gluteal region, and tapotement of the back—both accompanied by nerve frictions; and succeeding that other passive and then active movements, as seen in Figs. 55, 57, 68, etc.

In order to remove the waddling walk, I gave the movement shown in Fig. 71.

VII. NEURALGIA IN THE RIGHT FRONTAL REGION.

Gendarme-Sergeant Stanislaus R., 31 years of age, entered the Marine Hospital, Pola, on the 11th of December, 1888.

A year before, the patient had malaria, which left behind an intermittent neuralgia. He now complained of severe pain in the right frontal region, which had continued for several days.

He was treated for about ten minutes, when the pain disappeared.

Progress.—December 12th. Yesterday afternoon he felt slight pain for about an hour.

December 13th. Had no pain the day before.

Up to the 17th felt quite well. On that day he was dismissed as cured.

Treatment.—Frictions over the supraorbital nerve, and over the second cervical pair of nerves, produced sharp pain exactly at the place in the head where the patient suffered most. These nerves were treated—the first one with vibrations in the centripetal direction, the latter pair with light frictions and constant pressure. The patient was subjected to this treatment for ten minutes every morning.

VIII. SCIATICA.

Joseph Scopac, sailor, 23 years old, contracted a gonorrhœa on the 18th of June, 1888. On the 5th of July cystitis set in; on the 2d August, pain in the left gluteal region; on the 28th August, conjunctivitis (left eye); 29th August, ciliary injection; 31st August, œdema palpebrarum; 1st September, iritis with bleeding into the anterior chamber and dimness of the cornea; 5th September, intra-ocular pressure decreased; 8th September, pain in left leg; 20th September, in left ankle; 5th October, pain in the neck.

The patient says that when the pain in the eyes increases, it also gets worse in the leg; 15th October, the ciliary injection decreased; 22d October, the glands in the neck and groin were swollen, and there were white patches on the tonsils. For these, mercurial ointment and iodide of potash were prescribed.

On December 6th the patient complained of pains in the left hip-joint, and especially in the middle, between the trochanter major and the tuber ischii; muscular weakness which caused waddling toward left side when walking. Lying on the right side, he could not lift the left leg in the least without help.

On the left eye there was immobility of the pupil; dimness of the lens; the fingers could scarcely be counted at a distance of 2 metres; small ciliary injection on the lateral edge of the cornea.

On the right eye the papilla and surrounding parts were red, and could hardly be distinguished from each other. No pains; sight good.

The treatment was started on the 6th December.

Progress.—December 10th. No pain, only weakness in the leg, which makes the walk difficult. Ciliary injection gone.

December 14th. Walks straighter.

December 17th. Walks well, looks much better, can make nearly as much resistance with the affected leg as with the sound one.

December 18th. Discharged as cured from the sciatica.

Treatment.—The patient lay in the prone position. Transverse frictions were for some minutes made over the great sciatic nerve where it passes between the great trochanter and the tuber ischii. The nerve was followed in its course as far down as the popliteal space, and frictions were also given over the sensory branches coming out through the posterior sacral foramina.

For the muscular weakness I employed pétrissage and the other passive and active movements shown in Figs. 69-71.

For the eyes, I gave vibrations over them; frictions and vibrations on the sensory branches of the fifth nerve coming out round the orbit; and lastly, frictions on the eye itself (Figs. 33, 39).

IX. SCIATICA.

J. Slobec, foreman at the Pola Naval Arsenal, 47 years old, caught a severe cold on the 5th February, 1889. He was obliged to take to his bed for pain in his left leg, and remained under treatment at home for a fortnight. Then he was transferred to the hospital, and on the 22d of the same month he came under my care.

The patient was very tall, looked haggard and thin, and the cheeks were sunken in. He suffered from intense pain in the left leg. It started from the gluteal region, and went right down to the heel and the sole of the foot.

The pain continued constantly through day and night. He was unable to obtain sleep.

He could not stand on his left foot, but kept it forward, touching the ground only with the toes; and he held the knee bent, the gluteal region drawn in.

Neither could he draw himself up to his usual height. The pain grew worse on standing. He could only walk with the greatest difficulty from the ward to the operation room, and then he needed a stick in one hand, and an ambulance man to steady him up on the other side. He took very small steps.

The skin peeled off in large flakes over the gluteal region, caused by strong applications of iodine tincture. Frictions over the great sciatic nerve in the gluteal region and all down its course cause a most severe pain.

The left gluteal region was sunken in; the muscles were loose and relaxed.

Progress.—I treated him at once—in the morning. The pain was greatly diminished after I had continued for eighteen minutes.

February 23d. The previous day he was nearly free from pain until six o'clock in the evening, but it did not then, or in the night, get nearly so intense as formerly, and therefore he slept some hours. He found walking a little easier.

February 24th, 25th. Not treated.

February 26th. The improvement on the 23d had continued.

February 27th. Had felt very much better during yesterday, and slept well during the night. After the treatment he walked away unassisted, and held himself fairly straight. He used the left leg well.

March 1st. He does not feel any pain during the day, if he keeps quiet; when he walks, he feels some in the gluteal region. Walks with a long step. He feels a little weak at the hip-joint, and therefore he does not trust himself to walk much; holds himself more erect; can stand about for a long time without experiencing pain; sleeps as soundly as when he was completely well.

March 4th. Yesterday he walked for twenty minutes in the forenoon, and twenty in the evening, in one stretch, without feeling any pain.

March 6th. He can walk without a stick, and with a long stride. Walked for about an hour.

March 7th. Started active movements.

March 9th. Had the day before gone down one flight of stairs, and walked for an hour in the forenoon and one in the afternoon; had subsequently felt a little pain in the evening, but it soon passed away. When he walks up-stairs, he feels rather weak in the gluteal muscles on the left side.

March 11th. Previous day walked about a good deal; also down two flights of stairs and up again. He still felt the weakness in the gluteal region, but the pain did not return.

March 18th. On Saturday he had paid a visit to his own house, where he remained over Sunday. He felt well all the time. Has only a kind of prickling in the calf, after walking for some hours. The weakness in the gluteal region is now so unimportant as to cause scarcely any trouble at all.

March 19th. Walked about in town for six hours yesterday; part of the time up hill; no bad consequences; slept well; felt no weakness in the gluteal region. The muscles have regained their firmness and tone.

March 22d. Walked six hours on the 20th, seven hours on the 21st, on both occasions partly in rain, without any bad results.

March 23d. Caught cold again, when the left leg was seized with trembling, and he felt slight pain in the gluteal region and the popliteal space. This quickly passed away when he had rested a little, and this morning he was as well as ever.

March 28th. Has had no treatment since the 23d. Has every day walked from seven to nine hours, and felt well all the time. The branch of the arsenal with which he is connected is the waterwork department, and this necessitates much walking, as his workmen are posted not only in different parts of the building, but also in the town as well. This day I treated him for the last time. I met him since in the town, and he told me he felt well. One day he had even had to walk eleven hours.

Treatment.—As I had observed the great effect produced in cases of traumatic and rheumatic lumbago by vibrations over the most painful places, I decided to adopt this form of treatment here, and to try it on its own merits. In the first of the two cases of sciatica mentioned above, and previously, I had always used frictions, but they give more pain at the time of application. This man suffered so frightfully, that I would not have recourse to them, unless they were absolutely necessary.

The patient was placed in the prone position, with the left leg crossed over the right one, as in Fig. 5. I then placed the last phalanx of my thumb (the linen intervening between it and the skin) over the great sciatic nerve just where it comes out of the pelvis (Fig. 72), and gave vibrations, during the first day for eighteen minutes, and on the following days for fifteen

minutes. The good effect of this procedure was quickly manifest. Treated once a day. The active movements which I gave are shown in Figs. 57, 58, 69.

The patient had no treatment on February 24th and 25th,

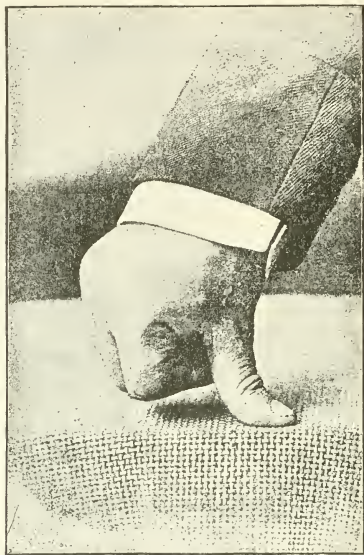


FIG. 72.

March 3d, 16th, 17th, 24th, 25th, 26th, 27th. He was thus treated only twenty-six times before the above result was obtained.

X. TRAUMATIC LUMBAGO AND SCIATICA IN THE RIGHT LEG.

Mr. E., 38 years of age, met with an accident in May, 1887. His horse shied just as he was in the act of mounting. The stirrup strap broke, and he was very nearly thrown off. At the moment he felt some pain in the lower part of his back, and this grew worse during the next three or four days. It gradually extended down the legs, especially the right one. He had also a feeling of heat inside the pelvis. He was treated

for about five weeks with massage in Gothenburg, and he gradually grew better. During the illness he continued riding on horseback for several hours each day. In October, 1887, while making a sudden pull to get on a riding boot, the same pain again set in. This time the pain was at its height in about four to five hours. He was again treated with massage in Gothenburg for two months, until he got quite well.

Present History.—On the 8th of February, 1888, he lifted a very heavy weight. He felt some little pain in the lumbar region at the same place as before, and this increased until Tuesday, the 14th, when the patient had great difficulty in walking, moving the back, or standing. When he had been in any one position for a little time (*e.g.*, standing, sitting, or lying) he could only change it with the greatest difficulty and pain.

The right leg could not be stretched properly at the knee-joint. The neuralgia in the ischias was of a sharp shooting nature, and felt most in the gluteal region between the great trochanter and the tuber ischii, in the popliteal space, and the back of the leg, somewhat to its inner side. There was also a feeling of cold radiating from each side of the coccyx over the gluteal regions. The sensory nerves over the sacrum were very sensitive to pressure and friction.

Progress.—On Tuesday, the 14th, I began the treatment. The pain was relieved after the manipulation, as also on the following day; but at night he caught a severe cold, and the pain was greater than ever.

February 15th, 16th, 17th. Treated twice on each of these days. On the last he was sufficiently recovered to be out all the evening.

February 26th. The pain in the back had nearly disappeared. In the ischias and other branches of the sacral nerves plexus, the pain still returned after long walks.

March 3d. The stiffness in the leg nearly gone. Can walk without difficulty and pain.

March 10th. Not treated on the 4th, 5th, and 6th, as he had been travelling about sightseeing, which means much walking; but still he felt well all the time. The treatment was continued for another week.

Treatment.—Frictions over the ischias and sacral sensory branches, pétrissage over the lumbar region, and vibrations

over the more sensitive places. Active movements from the very first day, as in Figs. 56, 71.

The exercise shown in Fig. 56 had to be begun at the floor with the toes steadied against the wall, and when the treatment finished it was made at normal height, with the heel as high up as the buttock.

XI. RHEUMATIC LUMBAGO.

F., 32 years old, Captain in the Imperial Austrian Navy, caught cold after a steam bath, on the 15th December, 1888. On the 17th he came up to the Marine Hospital.

He complained of pain in the whole lumbar region, radiating down over the gluteal regions. On examination it was found that the pain was greatest on a level with the transverse processes of the fourth lumbar vertebra. He could not undress unaided, could not walk straight, and could not bend the back. He had for over a year suffered more or less from rheumatism.

Progress.—After the first treatment the patient could move freely, and the pain ceased.

December 18th. Yesterday, toward evening, the pain came back, but was not so violent as before. After the treatment to-day it again ceased.

December 19th. The pain did not reappear. Could jump over the operation table after the treatment.

December 20th, 21st, 22d. The back was completely free from pain; all movements easy. Treatment stopped.

On the 21st, the patient complained of pain over the metatarso-phalangeal joint of the little toe. There was a dark red swelling, one inch long and half an inch broad, which was very tender to the touch. During the last few days we had had very cold weather, which had occasioned this frost-bite. After the treatment, which consisted of pétrissage and vibrations, the pain and the tension were greatly diminished.

December 22d. No tension; pain only on strong pressure.

The patient was treated for about a quarter of an hour once a day. The frost-bite was manipulated for a few minutes.

XII. TRAUMATIC AND RHEUMATIC LUMBAGO.

Dèlise, 42 years old, working man at the Naval Arsenal, Pola, came under my treatment on the 10th of February, 1889.

The patient had, during the month of May, 1888, lifted a heavy piece of iron, and had broken down under the weight. He then felt some pain in the lumbar region of the back. He continued working, although the pain gradually grew worse. He also caught cold, and this, too, settled in his back. He was in a very short time unfit for heavy labor, and only light work was given him.

After a few weeks, in the month of June, he could not go on with this either, because of the severe pain in his back, not only on moving it, but also when quiet. He was treated by several physicians in private practice, both at Pola and Trieste, but none of them could give him relief. In October, 1888, he entered the Marine Hospital, and after some weeks got rather better, when he left. Soon the pains set in again with their former intensity, and they became so severe that he was unable to obtain any sleep during the night, and entirely lost his appetite. He re-entered the hospital, and I was asked to treat him.

On the 10th of February his condition was as follows:

The patient looked very pale and worn, the cheeks were deeply sunken, and he had a very distressed expression of countenance. He complained of severe and constant pain in the lumbar region, radiating down over the gluteal regions; it was worse at night, and he got very little rest. Sometimes the agony was so great that he screamed out loudly.

He could not stand for more than a minute or two at a time, and then bent forward. He was incapable of dressing or undressing without help.

When he was lying on the operation table, face downward, the upper part of the lumbar region, at the first and second vertebræ, had not the normal curve, but was slightly bent backward. Opposite here the pain was most intense to friction or pressure. In this locality, also, the patient said he felt the pain greatest without being touched. He was extremely sensitive on the sides on the way down to the base of the spine. The great sciatic nerves responded painfully to friction.

Progress.—February 10th. I treated him at once. As the illness had lasted so long, I kept on for twenty-five to thirty minutes. The pain was then considerably diminished. The reaction ensued, and he became very weak, as if tired out, and he could not stand. He had to be carried down.

February 11th. During the previous day the patient had felt a great deal better, and had enjoyed more rest than for several months back, his sleep being less disturbed and the pain much easier. When it set in during the night, he tried himself to imitate my manipulation, and obtained relief by it. When he left the room, the other doctors present called my attention to his conspicuously free walk.

February 12th. He had slept through the whole night. The radiating pain over the gluteal region had gone, and only the original places in the lumbar region were painful. The patient looked brighter, and laid himself down on the operating table without any difficulty.

February 13th. Slept well; pain absent except on moving. During the night he felt only a kind of tenderness in the back.

February 16th. Slept well; entirely free from pain during the night. He has a keen appetite, which he has not had for many months.

February 18th. Feels pain only on quick movements. Began free active movements. Peculiarity in back gone.

February 26th. Has dressed unaided. Can, with arms extended upward, bend sideways and forward without any assistance. The pain produced by pressure or frictions greatly diminished. He can walk about for a considerable time without getting worse.

March 5th. Has for several days been free from pain after walking; he is about nearly the whole day; makes the active movements better and better each morning.

March 9th. He was so much improved that he could be sent from the hospital, but was to continue the treatment for some days yet. The active movements go very well. Bending forward he can touch the floor with his hands. In the morning these movements hurt him slightly at the beginning, but in the afternoon he feels nothing.

March 16th. Treatment stopped. He has to continue the active movements at home. After a week he resumed work at the arsenal.

Treatment.—In rheumatic and traumatic lumbago I always confine my treatment to the places which I find to be most painful to frictions. So I did in these two cases.

I placed my hands as shown in Fig. 73, the first phalanx of the thumb on one side of the spine, and those of the fore and long fingers on the other, over those situations which gave most pain. (It should be noted that the actual tips of the fingers are not applied.) Then I gave light vibrations and

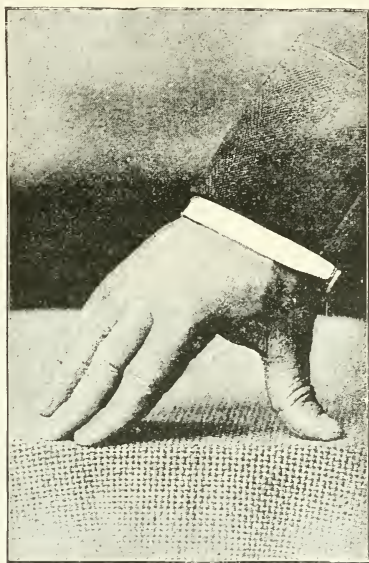


FIG. 73.

frictions alternately, and following these in both cases free active movements, consisting simply in bending, and turning in different directions, due attention being paid to correct positions.

At first, when these active exercises are made, I always give pétrissage at the seat of the pain, while the patient is moving. This eases it, and the movement goes better.

In the second case the patient was treated once in the

morning for twenty minutes, with the exception of the first day. After he had begun the active exercises, he repeated them once every afternoon.

XIII. STIFF NECK.

H. E., working man at the Naval Arsenal, 48 years of age, entered the Marine Hospital, Pola, on the 15th November, 1888.

Three months previously he had had a fever, after which stiffness of the neck and severe headache remained, the latter in the occipital region. The stiffness and the headache gradually increased. The headache was somewhat eased by the patient lying down on his back. At the infirmary he was treated with antipyrine and salicylate of soda. Of the first he had altogether taken about 9 grammes, of the latter 40 grammes.

On the 10th of December, 1888, he came under my care. His head was then immovable in all directions; the occipital headache was very marked; the cervical muscles were tender down to the shoulders. Sometimes the pain even passed down the arms. The slightest friction over the great occipital nerves gave intense pain.

Progress.—On the above date I started the treatment. The patient could move his head pretty well sideways and forward and backward after the first sitting.

December 11th. The improvement of the day before continued. After the treatment the pain was greatly diminished, and the movements were freer.

December 14th. Treatment and the movements, which are now normal in all directions, are painless. No headache.

December 15th. No treatment.

December 16th. Complained of noise in the ears and pain in front of them, tenderness of the sterno-mastoid, and tenderness and crackling in the temporo-maxillary joint.

December 17th. Noise in the ear lessened, as also the pain in the sterno-mastoid muscle, the pain in front of the ear, and crackling in the joint.

December 18th. Noise in the ear nearly gone. No pain anywhere.

December 19th. Discharged as cured.

Treatment.—The greatest pain was found at the places of attachment of the muscles of the neck to the occipital bone. There, then, I principally applied the treatment, which consisted in pétrissage. The muscles themselves I treated only very slightly.

On the pétrissage followed passive and active movements, as in Figs 47, 48, 62.

Here it was seen that a muscle acting under resistance contracts more forcibly—*i.e.*, the range of movement is greater—than when it does so unimpeded.

Lastly, I made light vibrations over the occipital nerves.

The noise in the ears, the pain in front of them, and the crackling in the joint, were treated with pétrissage and frictions over the facial and anterior auricular nerves.

XIV. TENDO-VAGINITIS.

K. K., sailor, 22 years old, came under treatment on the 12th of December, 1888. Six days previously inflammation had set in in the tendons of the extensores primi internodii and

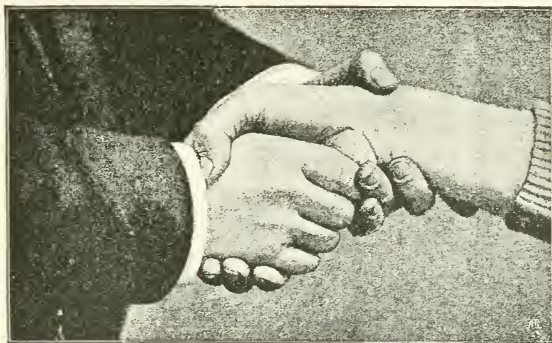


FIG. 74.

ossis metacarpi pollicis. It began spontaneously. The tendons were thickened for about 5 cm. in length, where they lie in their sheath of the annular ligament; strong friction sounds on movement; pain on touch and movement.

December 14th. Friction sounds still present, but only in

the neighborhood of the joint, absent higher up; pain is only felt in the morning.

December 17th. Friction sounds can nowhere be heard. Movement also in the morning completely painless.

December 18th. Dismissed cured.

Treatment.—I gave at first pétrissage; afterward passive movements, with strong extension of the affected tendons; these were followed by active movements under resistance for the affected muscles.

While I gave the pétrissage I bent the patient's hand strongly toward the ulnar side in order to keep the tendons extended, and thus prevent them from moving (Fig. 74).

The patient was treated every day from eight to ten minutes.

XV. WOUND OF THE CORNEA.

Miss M., dressmaker, Clapham, injured her eye on the 12th of December, 1887. She was shaking a towel when with one of the corners she struck her right eye sharply. Pain set in, and grew worse during the night. It was so severe as to prevent her from sleeping.

On the morning of the 13th she went to a doctor, who told her there was a cut "over the dark part of the eye." He put two drops of "something" into the eye, and gave her a lotion to bathe it with. I called in the evening to treat the lady of the house where she was working. As the pain had steadily increased during the day, I was asked to look at her eye, and if possible relieve her.

When I saw her about 9:30 P.M., the eyelids were swollen and red, the conjunctiva injected, the vessels in the sclerotic part of it enlarged and shooting toward the cornea. On examining the cornea, I found a wound close over the horizontal diameter, and a little to the outer side of the pupil. The wound did not now present the appearance of a cut, but had spread on all sides, and was somewhat larger than an ordinary pin's head. The edges were irregular and seemed turned up. There was a slight discharge of pus, much lachrymation and photophobia; the pupil was very dilated and fixed; it was not round but uneven. All the branches of the fifth nerve responded very painfully to friction.

Progress and Treatment.—I gave vibrations on the eye,

and frictions over the branches of the fifth nerve. I had to pursue the treatment for about twenty to twenty-five minutes before the pain entirely disappeared. As the lotion had done no good, I told her to discontinue it, to keep the eye covered, and to abstain from work.

December 14th. The pain came back later on, during the night, but only very slightly. She slept fairly well. The swelling and redness of the eyelids were greatly reduced; the injection of the conjunctiva, both on lids and eye, was also considerably diminished. The pupil reacts only slightly and sluggishly. On looking at a strong gaslight only little pain is felt.

December 15th. Pain in the eye completely gone. None during the night. Upper lid nearly normal; injection of eye less than on preceding day; pupil reacts better; wound in cornea healed up.

December 16th. No lachrymation; eye clear; can read ordinary newspaper print.

After a week's treatment she was able to do needle-work without difficulty or pain.

Treatment during all days, excepting the first, lasted ten minutes in the forenoon, five minutes in the evening. On the 15th I also gave nerve vibrations on the eye itself (Fig. 40). The treatment was continued for some days longer, and was given only in the evening for a few minutes.

XVI. SCAR ON PALMAR SURFACE OF RIGHT HAND.

Lieutenant P., of the Fort Artillery Battalion at Pola, consulted me on the 14th December, 1888. Four weeks previously he had cut his hand through falling with a spirit-lamp. The scar began about 1 cm. below the right wrist, and passed in half-moon shape over the anti-thenar until near the ulnar edge of the hand. It was about 6 cm. long, immovable, retracted, edges hardened and elevated. When the ring finger was stretched it was considerably drawn in at the wrist. The hand and the forearm were weak, so that the patient could not use them. The feeling in the little finger and ulnar side of ring finger was much diminished; friction over the ulnar nerve causing no reaction in these places. Adduction of the little finger not possible.

The first treatment was given on the 14th December, and after it the feeling in the little finger began to return.

December 15th. More power in the hand.

December 16th. Scar not retracted so much; edges softer.

December 17th. If the hand is placed flat on the table, the patient can adduct the little finger. Scar less depressed, and the drawing in at the wrist, on stretching the ring finger, is hardly perceptible. Scar in the hand freely movable.

December 18th. At the wrist it is free from parts under-

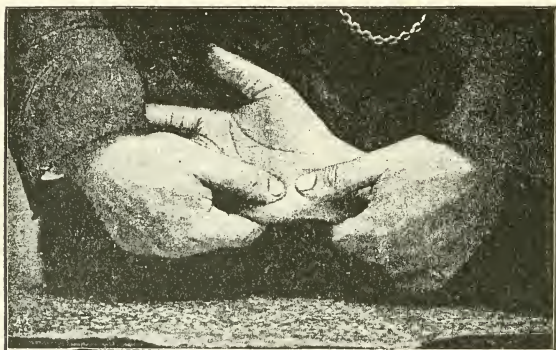


FIG. 75.

neath for about $\frac{3}{4}$ cm. The feeling in the ring and little fingers greatly improved. Power in the arm and hand normal.

Treatment.—I gave pétrissage over the elevated and hardened surroundings of the scar. In order to detach it from the parts underneath, the two thumbs were placed opposite each other, with the volar surface of the ungual phalanx on the scar, at a distance of about 1 cm., and in the direction of it. The thumbs were then moved toward each other (Fig. 75). Of course care was taken that the parts of the scar underneath the thumbs moved with them. In this way the adhesions were mechanically torn down.

The weakness in the little finger was caused partly by direct injury of the muscles, and partly by impaired power of the ulnar nerve. That the nerve was actually affected was

manifest from the direction of the scar, and from the fact that it did not respond to frictions over its course.*

The weakness of the muscles was treated with pétrissage and active movements under resistance. For the diminution of feeling I gave frictions over the ulnar nerve.

XVII. SEVERE BRUISE OF THE FACE AND CONCUSSION OF THE BRAIN, IN CONSEQUENCE OF A FALL FROM A DOG-CART.

Mrs. A. A. C., about 50 years of age, residing at Kensington, London, met with an accident on the 7th August, 1888. The dog-cart in which she was driving came in collision with a heavily-laden van, and she was thrown out. She fell on her face, was stunned by the blow, and taken to St. Thomas's Hospital, where restorative measures were applied. Gradually she regained consciousness, and her daughter, who accompanied her, then brought her to me. She felt very giddy while driving over. She had fallen on the left side of the face. The chin received the hardest blow, and was very badly bruised and open. The lower lip was cut through by the teeth in two places. The greatest swellings were over the two named places, and over the malar bone. The nose was swollen, but not broken. The right maxillary joint was very tender, and she could only open the mouth very little. Considerable pain was present in this region. The head ached.

Progress and Treatment.—The pain was taken away and the swelling greatly diminished by vibrations and light kneadings. The wounds through the lip were brought together with silk plaster, as she would not allow me to stitch them up; that on the chin was left open. I also gave nerve frictions in the neck for the headache. The patient felt well enough on leaving.

August 8th. When she called at my house the following morning, there was no dark discoloration anywhere, except on the lower lid of the eye. The lower jaw was more movable. She had slept pretty well, but was now and then awakened if she turned over to the side on which the injuries were. All the sensory branches on the skull and forehead were exceedingly sensitive.

I went to her house in the evening and treated her again. Treatment same as yesterday. In the afternoon a feeling of

sickness with giddiness and severe headache set in, and increased until seven o'clock, when I paid my visit. She could not bear any light in the room; would on no account open her eyes. The pulse was seventy beats a minute, lightly irregular. The seat of the pain she said was deep in the middle of the head. She was somewhat drowsy. I made frictions over the second pair of cervical nerves and light vibrations on the eyes (Fig. 32)—in all for about twenty minutes. The headache was relieved by this, and she could open the eyes, the gaslight causing her no inconvenience.

The feeling of sickness remained, and for it I gave general pétrissage of the abdomen, accompanied by light vibrations in the pit of the stomach. The sickness then passed away. She fell asleep during the latter part of the treatment, but awoke in an hour with the same sensation of nausea, which was again taken away, and she again slept. This happened three times successively up till midnight, when I went away. I remained so long because it was the first case of that kind I had subjected to this treatment.

August 9th. After I left last night the patient had slept off and on until the morning. The headache was gone and also the sickness, but she said she did not feel quite clear in her head. There was some yellowness about the bruised places, all of which healed very well. The scab over the bruise on the chin peeled off. The branches of the fifth nerve on the forehead were still very tender. Frictions over them caused a slight feeling of sickness.

Treated once in the forenoon.

August 10th. Yesterday afternoon the sickness returned, but only in a very modified form, and she had also a slight headache; both soon passed away. Slept very well during the night. No feeling of sickness or headache this morning. Head clear. All bruises and cuts healed up.

August 11th. The patient felt very well. I stopped the treatment, but told her to let me know at once if sickness or headache reappeared. They did not.

XVIII. ULCERATED EXTERNAL HEMORRHOIDS.

Mr. C. S., 42 years of age, civil engineer, London. The patient has a nervous temperament. He leads a generous life, and is very plethoric. Digestion disordered for several months

back; has for a long time had a nervous cough, probably reflex from the stomach. At the beginning of January, 1888, he went down to Brighton for change of air, as he felt considerably out of sorts. While there, he read of the wonderful properties of certain pills, and their purifying effect on the blood. He at once proceeded to try them, and in rather large doses. The consequence was a violent diarrhœa, followed by an equally obstinate constipation, with the disagreeable sequel of external piles. He now went from Brighton to Hastings, where he became worse, and had to lie in bed. The piles gradually began to inflame and ulcerate. At last, Mr. S. was advised to return to London, in order to undergo an operation. The idea of this rather terrified him, and he came first to me on the 21st of February, 1888.

There were no less than seven ulcers clustering all round the anus, and the surrounding redness, which was very intense, extended high up on the gluteal regions. Several of the ulcers were three-quarters of an inch long and a quarter of an inch broad. The edges were elevated.

I wished to make complete internal examination, but the patient would not allow it, because of the pain it caused him at Hastings. He suffered greatly on walking. The stools gave him much pain, and this remained for a considerable time afterward.

Progress.—I treated him at once for rather more than half an hour, when I succeeded in relieving the pain and irritation. In the evening I occupied the same length of time.

February 22d. He felt considerably easier, and the redness on the gluteal regions had disappeared.

February 24th. He had improved from day to day, and could now walk about comfortably.

February 26th. The ulcers had entirely lost their inflammatory appearance, had sunken, and were diminished; the stools gave no pain.

February 27th. The patient started on a six weeks' travelling tour on the Continent, the ulcers soon healed, and he had no discomfort whatever.

Treatment.—I first washed the ulcers with a solution of corrosive sublimate (1: 2,000). Then I placed a moist piece of lint over the particular ulcers to be treated. Over this again I laid gutta-percha, in order to prevent the heat of my hands

being transmitted to the inflamed piles when I made the vibrations. I subjected one side at a time to manipulation. I treated the patient twice a day up to the 24th, the duration of the treatment decreasing with each sitting. I also gave frictions over the sensory nerves on the sacrum, and over those on the gluteal region. After that I made shakings and tapotement of the liver; nerve frictions in the back opposite the lower angle of the scapula on the right side; and lastly, general pétrissage of the abdomen. I supplied the patient with some corrosive sublimate solution and lint for the journey, in order to keep the ulcers clean.

XIX. STIFF KNEE FORCIBLY BROKEN DOWN.

The following case dates as far back as the summer of 1884, when I was in charge of my brother's institution in London. Dr. Thomas Easton, of Stranraer, was also there studying the treatment. He has been kind enough to send me the notes which he took of the case at the time. They are as follows:

Paul W., Holly Bank, Sheffield, engineer, suffered from rheumatism for many years. It was first contracted at a colliery work, where he was often exposed to damp and cold. At first the rheumatism was mostly confined to his right shoulder. In February, 1883, he felt the pain in his right knee, but after applying cold water to it for a day or two it disappeared. He had then a period of six months during which his health was very good. In November of the same year the rheumatism returned, and his right shoulder was severely affected. At this time he had a fall, bruising the right knee. The rheumatism spread more over the body, attacking the left hand, and finally seemed to settle permanently in the right knee. The patient was then confined to bed for ten weeks, during which his knee was kept at rest.

Hot fomentations and blistering were tried, and subsequently mercurial ointment, but the result of the illness was a stiff knee. A month or two later, the patient put himself under the care of Mr. Kellgren, of Eaton Square. He remained one month under his treatment, but only made slight progress. Mr. Wood then went to Cardiff, and his medical advisers there partially broke down his knee in two separate

operations under chloroform and ether. After the operations the knee was put up in a bent splint.

In the autumn of 1884 the patient returned to Eaton Square, and, in the absence of Mr. Kellgren, the treatment which he had before received was recommenced by Mr. Arvid Kellgren. He made but slow progress, and suffered great pain. It was then suggested to him that the knee might be more forcibly broken down under chloroform. I accordingly put him deeply under chloroform, while Mr. Arvid Kellgren broke down the adhesions round the knee. The operation was performed twice, at an interval of a fortnight. The first breaking down was only partial, but on the second occasion, on the 10th of September, the knee adhesions were completely broken down, the leg being flexed on the thigh as much as it can be under normal conditions. The pain after the operation was very severe, and the swelling around the joint considerable, but after pétrissage and effleurage had been applied, the pain almost disappeared.

Thursday, September 11th. The patient passed a tolerably good night, though he was rather feverish. The pain only gave slight discomfort. Spasmodic jerks were felt during the night at the knee-joint.

On examination, the joint was found to be more swollen than on the previous evening, and there was slight discoloration in front, just below the patella. The joint was then moved, active and passive movements being tried. After the movements pétrissage was given. Pulse, 82; temperature, 99°. The patient expressed himself much relieved after treatment.

Friday, September 12th. The patient felt feverish. Temperature, 99.5°; pulse, 84. The tension in the knee was greater, and the area of discoloration had extended much further in front. Movements and massage were again applied. The same evening his temperature rose to 100°, but after the treatment it fell to 99°.

Saturday, September 14th. Temperature, 99.2°; fell to 98.8° after treatment; pulse, 78. Swelling still great. The discoloration more diffused; pain less, but jerking spasms.

The same evening the temperature was 99.6°, and pulse 82. After treatment these were respectively reduced to 98.8° and 78. The swelling was still great, but the extravasation color was changed, and movement in the joint through a small limit was easier and without pain.

Monday, September 16th. Temperature, 99.2°; pulse, 84. Swelling still considerable, and jerking pains annoying on going off to sleep.

During the following days the pain on moving subsided in a marked degree, and the discoloration and the swelling rapidly disappeared. On Sunday, the 15th, the patient had gone down-stairs, and after a fortnight he came to Eaton Square. On the 20th of October he left London, although we told him that a longer stay was necessary. On the 1st November he writes as follows: "I find I can walk fairly well, though the leg does not bend much past the right angle, nor will it go perfectly straight like the other."

As long as the patient stayed at home he was treated twice a day, half an hour on each occasion; afterward once a day.

XX. INFRA-CLAVICULAR DISLOCATION OF THE LEFT HUMERUS.

Marcus F., 47 years old, workingman, came to the Marine Hospital at Pola on the 21st February, 1889, with the left shoulder dislocated. He said that a cart-load of sand had fallen upon him the day before. The pain in the left shoulder was so great that he turned quite faint, and could not rise without assistance. On examination of the shoulder, the head of the humerus was found lying under the clavicle. The swelling from exudation was considerable, and extended over the whole of the upper arm, on the inner side of which discoloration began to show itself.

On the 22d, in the morning, the patient was put under chloroform, and the humerus replaced by circumduction. The arm was afterward put in an ordinary sling.

February 23d. I began with passive movements—viz., pétrissage, effleurage, rolling (Fig. 50). Unnecessary movement at the shoulder during the pétrissage and effleurage was prevented by stretching and adducting the arm to the side with one hand, while I worked with the other.

February 24th. No treatment.

February 26th. The arm during the rolling could be carried as high up as the level of the shoulder. There was great discoloration on the inner side of the upper arm. On the previous day the patient tried to move the arm himself, and had got it partly dislocated again, the head of the humerus being

on the anterior and lower edge of the glenoid cavity. In order to prevent a recurrence of this, the arm was bandaged up over the chest. Began with active movements.

March 1st. He could stretch the arm horizontally forward, and if he steadied the hand against the wall of the room he could work it up until it reached nearly as high as the sound one. The rolling, extension, and flexion go much freer. When he half lies with the back steadied, I could without difficulty stretch his arm straight up. He could place his hand on his neck.

March 6th. The arm was left free, and he was told to move it about often during the day. He can reach as high up with the hand of the injured arm as with that of the sound one.

March 7th. The active movements under resistance show that the muscles round the affected shoulder have almost completely regained their strength. The topographical appearance of shoulder normal.

March 14th. Treated for the last time but allowed two days' rest from work.

The patient was treated once a day for about fifteen to twenty minutes, with the exception of the 24th and 25th February, and 3d and 10th of March, when no treatment was given.

XXI. FRACTURE OF THE LOWER END OF THE RADIUS.

A. R., sailor, 20 years old, working in the engine-room. On the 10th of December, 1888, he fell on the dorsally flexed left hand. Severe pain, extravasation, and swelling ensued. There was an oblique fracture of the lower end of the radius, starting at the ulnar side below, and going outward and upward. He had his arm in splints, which by my direction were removed, and they were not replaced so long as he remained under my care.

Progress and Treatment.—December 12th. I began the treatment, which consisted in pétrissage, effleurage, and other passive movements, rolling, etc. The patient felt considerably easier after the treatment, the pain at the fracture and joint being diminished.

December 15th. Swelling nearly gone. During the passive movements he feels some pain at the seat of fracture.

December 16th. He yet feels pain at the seat of the fracture from the passive movement. He can extend and flex the hand at the wrist nearly normally, and without any pain. As yet he cannot lift anything. The exudation has disappeared to such an extent that the flexor tendons are clearly seen. Active movements under light resistance have been started.

December 17th. During the night he had slept on the arm without any bad consequences. The active movements go better, yet he cannot lift anything; can close the hand completely and rather firmly. Free supination and pronation possible, but he feels pain at the seat of the fracture on resistance being made. The passive movements—such as rolling, flexion, and extension, etc.—are painless.

December 18th. Active flexion and extension movements can be made without the arm being steadied at the seat of the fracture.

December 21st. Stopped the treatment, as I left Pola. No movements gave pain—all were normal, and the patient could lift light articles, such as books, etc. The treatment lasted each day for about a quarter of an hour. When I gave pétrissage and effleurage, I steadied the whole arm on the table, and with the left hand I fixed the fractured place. During the other passive and active movements I grasped with one hand the fracture, so that thereby the pieces were kept from moving. As there was no one in Pola to continue this special form of treatment, the splints when I left were replaced.

XXII. STIFFNESS OF ELBOW-JOINT AFTER FRACTURE AT THE UPPER END OF THE RADIUS.

H. J., Lieutenant in the I. and R. Austrian Navy, came into the hospital at Pola on the 27th of January, 1889, having fallen on his right elbow from a bicycle. Great pain, immobility, and swelling were present at that joint.

January 28th. The contusion was strongly colored; abnormal movement and crepitation were felt about two fingers' breadth from the head of the radius. Plaster-of-Paris bandage was applied on the arm, which was held at a right angle and midway between supination and pronation.

February 18th. The plaster-of-Paris bandage was removed, and I was asked to correct the abnormal position.

There was very little mobility at the elbow. The amount of extension and flexion was about 20° in each direction, with the right angle taken as starting-point. Supination and pronation absent. The wrist-joint was stiff, and did not allow of much movement. It was also very weak.

He could only with the tip of his thumb touch the protruded chin, or the forehead when the head was bent forward. Could with difficulty pass the hand behind his back, and he was unable to move it higher than the lumbar region.

When the arm was passively extended, the tendon of the biceps muscle was felt to be very tense.

Swelling was still present, especially over the outer side of the elbow, and extended for some inches up and down, obscuring the contours. It pitted deeply on pressure, and remained so for some time.

Pain was felt on pressure over the swelling at the seat of fracture; at the elbow and wrist-joints on moving; and in the ulnar nerve, where it passes behind the internal condyle of the humerus, because round it exudation had settled and filled up the groove.

Treatment and Progress.—I took the case in hand on the 18th of February. The treatment consisted in pétrissage, effleurage, and other passive and active movements, some with, some without, resistance. I gave them all from the very first day. During the treatment, crackings were often heard from the tearing of organized exudations.

March 9th. The arm had regained its strength; the bending and stretching had so much improved that the angle formed during movement was 160° . Supination and pronation were already normal on the 6th; the patient could go through the fencing movements with the sword very well. No pain in the ulnar nerve on strong flexion; no movements caused pain, they were all performed with freedom and ease.

March 16th. The bending at the elbow was nearly normal; same with the stretching. Passing his hand behind his neck, the patient could touch between the shoulders with the fingers; and passing it behind the back, he could reach the shoulder of the same side (*i.e.*, the right one).

The patient had already, on the 9th, left the hospital to resume his naval duties. After the 16th he remained away for several days, and came afterward a few times for treatment.

The treatment lasted every day for about twenty minutes, and it continued a longer time than usual because of the short-

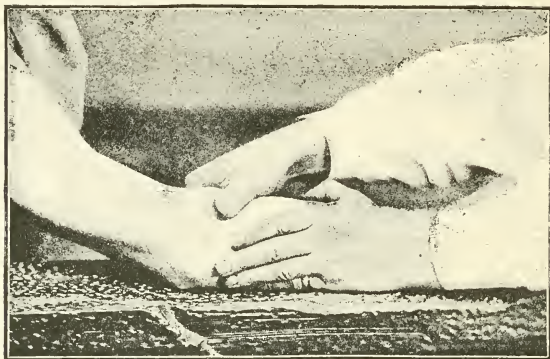


FIG. 76.

ening of the biceps muscles, and the pain in the ulnar nerve caused by the exudation round it.

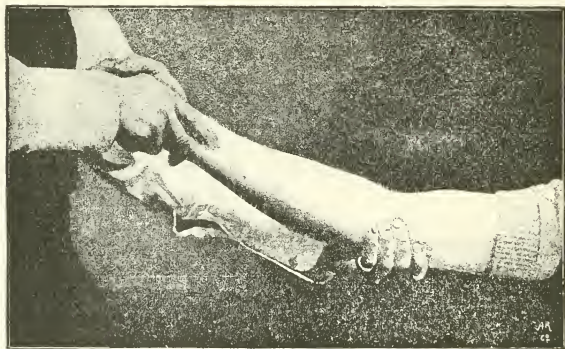


FIG. 77.

I should wish to draw attention to the following points in the accompanying illustrations of movements given during the treatment of the above case. In Fig. 76, showing pétrissage

at the elbow over exudation there, it should be noticed how completely the position of the left hand steadies the arm.

I have treated fresh fractures round the elbow at once with pétrissage without causing the patient much pain, because steadiness of the arm was thus secured.

In Fig. 77 note the application of the hands for pronation and supination of the forearm. The one grasps the elbow, the other the hand, with two fingers passed down in front of the wrist.

In Fig. 78 we have the application of the hands for gradually breaking down a stiff wrist. Both hands are placed

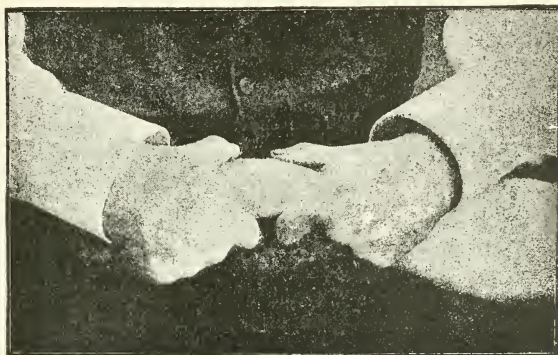


FIG. 78.

close to the joint. Passive extension and vibrations are made as we move it.

XXIII. DOUBLE FRACTURE OF FIBULA AT ITS LOWER THIRD, WITH FRACTURE OF THE EXTERNAL MALLEOLUS.

W. R., 24 years old, Lieutenant in the 97th Austrian Infantry Regiment, was carried to the Marine Hospital on the 1st of February, 1889. He had been riding on horseback. The horse fell, and he had his right foot under it. The foot was strongly inverted just after the accident. The patient complained of fearful pain, especially at the internal malleolus. The parts round the ankle were greatly swollen. Examina-

tion showed fracture of the fibula at its lower third, where crepitation was felt. The internal malleolus was also believed to be broken, but owing to the pain and excessive swelling it could not with certainty be decided to what extent. The leg was put in a Petit-boot. The pain grew so unendurable during the night that the patient had to send for the resident surgeon, who ordered an ice compress. On the 4th, several bullæ, each the size of a sixpence or more, made their appearance on the inner and lower part of leg and ankle. They contained serum; were opened and treated with iodoform bandage.

On the 12th of February I saw the patient for the first time. The foot and leg were immensely swollen, the swelling extending as high as the knee-joint. The exudation was rather firm, pitted everywhere deeply on pressure, and the pits remained long.

The skin had a greenish-yellow color. There were three especially painful places, and after the treatment had been given for some time the fractures could very well be made out. One was transverse 10 cm. high; another oblique, running from below upward and backward, and ending posteriorly about 3 cm. above the tip of the external malleolus. Both were on the fibula. On the internal malleolus there could be felt a longitudinal furrow, starting at the tip and going upward for a distance of 2 cm., and then bifurcating forward and backward, ending 4 cm. high anteriorly and 3 cm. posteriorly. It was thus easily to be seen that the injury had been caused by a crush. The bullæ were not completely healed. The foot was stiff.

Treatment and Progress.—It consisted as usual of pétrissage and effleurage; intermingled with and following on the former being other passive movements, such as rolling, extension, and flexion, etc.; then active movements, partly free, partly under resistance; and lastly, frictions over the internal and external popliteal nerves.

February 19th. The swelling has gone down on the leg, but remains round the ankle and upper part of the dorsum of the foot, although considerably diminished. The movements at the ankle go pretty well, and do not cause nearly so much pain as at first. The fractured pieces adhere well to each other. The bullæ have healed. They had delayed the treatment on the inner side of the ankle.

February 26th. The swelling round the ankle much diminished, and on the dorsum of the foot it is gone. The passive and active movements are scarcely felt at the fractures. The patient can move his feet freely. I decided to let him try to walk, which he did, steadied on both sides. He kept the foot stiff, both because he was somewhat nervous and because he felt pain in the joint when he rested his weight upon it. It was, he said, a sort of burning sensation. As I supposed that the pain was caused by exudation in the joint itself, I gave rolling of the foot, and passive extension and flexion, rather longer than usual. At the fractures he felt no movement on walking. The muscles of the calf are smaller on the injured leg, and do not act so well.

March 6th. Walked up and down the room for over five minutes. The foot turned very red, but there was no pain in the joint. He walks pretty quickly and steadily without assistance. He feels the foot somewhat stiff, from a dragging behind at the heel and internal malleolus. From to-day, the foot and leg lie free.

March 12th. He has walked more and more every day, and each time with greater ease. In order to diminish the stiffness and to stimulate the muscles of the calf, he had to make the movement shown in Fig. 58. When doing so for the first time, he slipped and twisted the foot again. This gave him pain at the seat of the fractures, but it speedily passed away on application of vibrations.

March 13th. During the night he had felt pain in all the fractured places, but it was very slight. Treated as usual and made to walk as before.

March 14th. Free from pain yesterday and last night. The swelling, which is very stubborn on the inner side of the ankle and round the Achilles tendon, has greatly subsided. The movements in the foot are normal, except dorsi-flexion, which is somewhat prevented by the Achilles tendon and by the tendons passing round the thickened internal malleolus. The muscular power developed is good. Is allowed to dress and go about the room; must, however, when sitting keep the leg in the horizontal position.

March 19th. Walked out yesterday morning for the first time. Had to go up and down two flights of stairs. Going down-stairs was somewhat difficult, but up-stairs not. Went

out again in the afternoon and walked about for an hour in the hospital garden. The patient was not allowed to use his own boots, but used a pair of large ones.

March 23d. Walked into town yesterday with his ordinary boots on. Felt nothing beyond a little stiffness in the ankle. He was on his feet for over three hours. Walks with a full step.

March 30th. Goes on leave next Monday, the 1st of April. Treated to-day for the last time.

The malleoli are thickend from the exudations at the seats of the fractures. They have the following measurements in

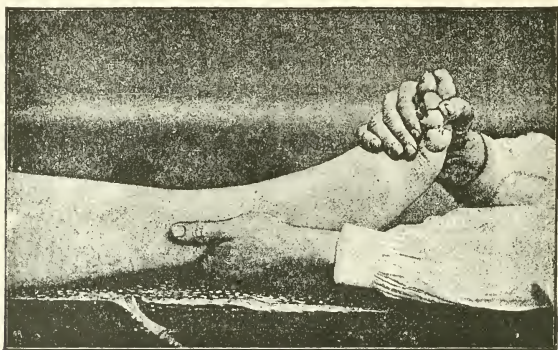


FIG. 79.

comparison to the sound ones: Internal malleolus on broken side, $4\frac{1}{4}$ cm. broad; on sound side, $3\frac{1}{2}$ cm. External malleolus, $3\frac{1}{2}$ cm. on broken side; 3 cm. on sound side.

The case ought to have been under manual treatment from the very first day. The exudation would then never have been allowed to settle as it did, and the recovery would consequently have been very much quicker.

The illustration (Fig. 79) shows how the thumb is applied alongside the fibula in order to act as a splint while we extend and flex the foot.

I met the patient on my way to Vienna at the end of April. He then walked well, and it was only when he walked very quickly that one could see that his foot had been injured.

The patient had no treatment on the following dates: February 17th, 24th, and 25th, March 3d, 10th, 17th, 24th, 25th, 26th, and 27th.

Bearing in mind the structure of the foot, it will readily be seen that it is possible to evert and invert it without danger provided we take the precaution of placing the hand over the point of fracture, and the foot be held at a right angle to the leg. These movements do not, as we know, take place at the ankle-joint, but chiefly at the astragalus, scaphoid, and calcaneo-cuboid articulations.

XXIV. DOUBLE FRACTURE OF THE FIBULA AT ITS LOWER THIRD.

On the 15th of January, 1887, Mrs. L., 43 years old, slipped and fell as she was stepping out of her carriage. She rose up and fell again. On both occasions she heard a distinct cracking in her left ankle. The second time of falling she fainted away.

On examination it was found that the fibula had sustained two fractures: one oblique, running from below forward and outward, about 10 cm. from the tip of the external malleolus; the other transverse about 3 cm. from the tip of the same malleolus. At the upper seat of injury the pieces of bone were somewhat displaced, and here the effusion appeared first; at the lower there was no displacement, but the fracture was felt very well when the foot was inverted.

Progress.—January 15th. Between the first two applications of the treatment on the day of the accident, the swelling did not increase very much, and the patient had no pain.

January 16th. During the preceding night, a considerable amount of effusion had collected round the ankle, over the dorsum of the foot, and upward as high as the upper third of the calf. It was not very tense, and pitted easily on pressure, but the depressions quickly disappeared. There was no discoloration. The patient had slept well and had had a painless night.

January 23d. The effusion has passed almost entirely away, remaining only over the fractures and on the inner side of the ankle; but the cause of its appearance in the latter place was, I believe, gout, which was present as a complication.

Over the whole of the leg in general no discoloration had been present, except a slight yellowish tinge; but high up on the posterior surface of the calf I noticed on the morning of the 17th a dark blue color, which indicated to me that I had not carried the treatment sufficiently far.

There has been no pain. The sleep had been undisturbed. The patient can extend and bend the foot to a considerable degree without much difficulty. Eversion and inversion slight. When the same active movements are made under resistance they go better.

January 30th. The effusion is gone, but it still remains over the fractures and inner side of ankle, although in a much smaller amount. All the movements can be performed easier and with more force.

February 6th. Scarcely any effusion over the fracture. On the inner side of the ankle it comes and goes, owing to the gouty condition. The patient has during the week walked about the room unassisted, simply steadying herself by the furniture. No movement perceptible at the seat of the fractures. Active movements performed with considerable force. Both they and the passive are nearly normal in range.

February 20th. The patient can walk quickly up and down stairs. The movements at ankle-joint normal in range and power. No abnormal thickening at the seats of the fractures.

Treatment.—No splints were applied. The deviation of the foot was corrected simply by muscular action. When the patient was sitting or lying, the foot was steadied at a right angle to the leg.

Pétrissage and effleurage were given from the very first, and also vibrations over the situation of the fractures. The former were administered for the effusion; the latter more especially for the pain. During the first days other passive movements, such as rolling, bending, stretching, eversion and inversion of the foot, were given in order to prevent exudation from organizing and causing stiffness. Active movements as in previous case.

The patient was not kept in bed a single day. She was helped down-stairs every morning, and had then to use the foot as little as she could at first, but it was always held at a right angle to the leg. From the third day, the patient was

allowed to drive out, the same precaution being taken about the foot as when she was sitting in her room.

During the first weeks the treatment was given twice a day.

XXV. CYSTITIS.

Mr. L. R., 30 years of age, had for several months been troubled with a slight gleet. In order to get rid of it quickly, he had recourse to a 1-per-cent injection of nitrate of silver, which he had heard would produce an immediate cure. He used the injection so carelessly that a part of it passed into the bladder. This caused him extreme discomfort; so much so, that he was compelled to remain completely quiet for over an hour after its application.

It was a very warm summer day, and the patient in the afternoon took some ices. He very soon began to shiver, went home, and repaired to bed, where he was obliged to remain three days. Fever, vomiting, intense irritation of the bladder, pain in the perineum and lower part of the back and sacrum, set in. His appetite entirely left him, and he could only drink acidulated water, and take fluid food; there were constant calls to empty the bladder, which were accompanied and followed by intense irritation and a desire to void the urine though the bladder was empty. He had very little sleep at night.

On the fourth day, September 3d, 1888, when he came for treatment, the above symptoms had slightly subsided. He looked worn and haggard, suffered from a feeling of great prostration, and bitterly repented having tried to work his own cure. He had no fever; the appetite had so far improved that he could take very light food. Walking was exceedingly disagreeable to him, as also driving, because both set up irritation in the bladder.

The urine deposited pus, mucus, triple phosphates of ammonia and magnesia.

Progress.—September 10th. The patient has been treated twice a day from the 3d. The very first treatment on that day gave him relief for some hours. He felt no discomfort on walking home. He passed a much better night, more rest and sleep being enjoyed. There has been a constant improvement from day to day. The urine is now passed two to three

times a day, and he does not need to rise during the night. For the last two or three days he has had no feeling of irritation after emptying the bladder, but only a kind of weakness. The deposition of phosphates, mucus, and pus greatly diminished. The appetite is improving.

September 24th. The patient has been treated once a day since the last report. He caught cold on the 14th, and had a slight relapse, which, however, soon passed over. For some days he has felt completely well. No abnormal deposits in the urine. Appetite good. Treatment stopped to-day. He decided to let time and light injections cure the gleet.

The patient has had no trouble from his bladder since the above date.

Treatment.—The special treatment consisted of tapotement over the lower lumbar, sacral, and perineal regions; light shakings of the bladder, both from above the pubic arch and the perineum; vibrations above the pubic arch; nerve frictions for several minutes over the lower lumbar and the sacral nerves; and, lastly, pétrissage of the abdomen. The nerve frictions were the most effective in reducing the irritation and inflammation. The patient drank a considerable amount of water, acidulated with the fresh juice of lemons.

XXVI. MIGRAINE.

Mr. C. A., aged 27, had since August, 1888, suffered greatly from sudden onsets of violent headache. At first some time elapsed between each attack, but the intervals grew shorter until at length the patient had barely recovered from one attack before another began and in this manner more than a week would sometimes pass before he obtained complete relief.

The headaches are preceded by a heavy dull sensation in the head and shimmering (?) before the eyes in the morning when the patient awakes. The dull feeling passes away during the forenoon, but late in the afternoon pain suddenly sets in, and grows more and more severe toward night. The pain may reach its height at once, or its increase may be more gradual. It is throbbing in character, is felt most behind the eyes, and is generally equally acute on both sides. Light intensifies the pain. The patient dreads going to bed, because the recumbent position makes him worse. When he does lie

down, he after some hours goes off into a heavy sleep, and wakes up the following morning with a feeling of oppressive drowsiness, which on more than one occasion has lasted for several days.

These attacks leave him very nervous and exhausted.

The patient never feels sick.

He has found that the headache is brought on by fatigue, by sitting up at night, and by very strong light, as in theatres.

In the summer of 1888 he also became subject to attacks of palpitation. The first rendered him nearly insensible; he felt pain down his left arm, and had considerable difficulty in drawing his breath.

During the attacks of palpitation, the apex beat is seen and felt over a considerable area; the sounds are strong; the pulse is between 80 and 90 beats a minute, and full. The patient is very sensitive between the shoulders. The palpitation comes on at any time—sometimes it follows a meal, sometimes several hours afterward.

The patient smokes cigarettes.

The appetite and digestion are good.

Treatment and Progress.—On the 4th January, 1890, he was first subjected to treatment, which consisted of general movements, and, as special applications for the migraine, frictions over the nerves of the head and neck; for the palpitation, nerve frictions between the shoulders and vibrations over the apex of the heart.

At the end of January the attacks were less frequent, and very often, although the premonitory symptoms appeared in the morning, no headache followed, as treatment in the forenoon intervened. Palpitation has not occurred after the first week of treatment. During this month the patient has been treated regularly every day.

In the last week of February the treatment was discontinued, as there had been no headache for some time. When they had come on they disappeared after a short application of nerve frictions, alternating with pressure over the second cervical pairs. The treatment had not been given regularly during this month, often only two or three times a week. The general condition has greatly improved; no palpitation during the month.

XXVII. ACUTE INFLAMMATORY GASTRO-INTESTINAL CATARRH IN A CHILD.

H. S., aged 15 months, was during the night of the 10th July, 1889, suddenly seized with vomiting and diarrhœa. Up till then he had been perfectly well. The stools grew more frequent toward the morning, occurring every half-hour or twenty minutes.

I first saw the child at 8 A.M. on the morning of the 11th of July. The face had a pinched expression, the spaces round the eyes were dark and sunken, the fontanelles depressed. He was lying in a listless position, feebly whimpering every now and then. The pulse was very feeble, and went at the rate of 170 beats in the minute; the temperature was 102.2°. The motions were watery, intermingled with little lumps and some blood.

Treatment and Progress.—The local treatment consisted of vibrations over the abdomen for about twenty-five minutes, followed by slow and gentle pétrissage of the abdomen. Light frictions over the dorsal nerves and those of the neck, and some on the arms and legs, were also administered, partly with a view to reducing the temperature and partly for general stimulation.

When I returned in the afternoon at four o'clock, the temperature had gone down to 100.6°; he had had four calls to stool. The boy looked much better, he took notice of what passed around him, and chattered all the time I treated him.

At eleven o'clock in the evening I found my patient peacefully asleep, having been in this condition for two hours. He had been much better after I left in the afternoon.

July 12th, 4 P.M. The child had slept all through the night; had no fever, no diarrhœa. Treatment same as day before, and given for the last time. The boy was allowed to rise the following day. Light and cautious diet was prescribed. There has been no relapse.

In September, 1886, I had also a patient, a boy ten years old, suffering from the same complaint. He had turned ill in the evening very suddenly when going to bed. The vomiting in this case was very distressing, the stools were more watery, the pain in the abdomen was very considerable. I

treated him after the same manner as the above case. The sickness and diarrhoea ceased on the following morning.

XXVIII. PERITONITIS.

A. S., aged 8, came under my care on July 13th, 1889. On the previous day he had complained of slight pain in the abdomen. The pain subsided toward the evening, but returned suddenly and with great violence on the following afternoon, accompanied by vomiting. I was at once sent for, but could not call before midnight. I then found the patient lying on his back with his knees drawn up, and the abdomen greatly distended. He complained of constant pain all over his abdomen, which was greatly increased by the slightest touch, movement of the body and legs, or by respiration. He was unable to draw his breath deeply; the respiration was short and thoracic. The pain was most intense in the epigastrium and round the umbilicus. There had been no action of the bowels. The temperature was 103°; pulse, 150.

Treatment and Progress.—After vibrations had been applied for about thirty minutes, the pain subsided to such an extent that the patient could stretch his legs out and could make deep respiration without much discomfort. I could now also make some pressure on the abdomen with the entire hand. Pointed touch with the fingers alone could not be endured. In addition to the vibrations, I gave frictions over the cervical nerves for several minutes, as well as over the dorsal sensory nerves.

July 14th. Forenoon. The boy had slept for about two hours after I left. He then woke up and became slightly delirious; the pain had also increased. Before leaving on my previous visit, I had shown the boy's mother what she had to do in case of a recurrence of the pain, and how she should apply the vibrations. She now made them at once, and the patient grew easier and slept again. Toward the morning he awoke once more, and for the second time she renewed the treatment, with good result. The temperature had fallen to 101°, the pulse to 120. The pain has considerably diminished, and the respiration is to a great extent abdominal. Treatment same as on my first visit. In the afternoon the temperature had fallen to 99.8°. Treatment repeated as before.

July 15th. I saw the patient in the afternoon. The temperature was normal; pressure only produced slight pain. Very light pétrissage of the abdomen was given for the first time. The patient could take a little fluid food, such as milk and beef-tea.

July 16th. The bowels were moved last night. Did not complain of pain. Treatment same as yesterday.

July 18th. The boy was allowed to get up and to lie dressed on the top of the bed. Could scarcely stand from weakness. Has had some finely-divided meat and fish. Bowels have been moved once a day.

July 22d. The patient has been up and about during the last three days. Treatment discontinued.

The vibrations served the purpose of relieving the pain, preventing peristalsis, and reducing the inflammation.

I should like to add that I feel greatly indebted to the boy's mother for the rapid progress toward recovery in the last two cases. She had herself for several years been more or less under manual treatment. She is gifted with an unusually good hand, and could therefore correctly apply the vibrations.

ANTIPYRESIS.

BY

PROF. DR. ARNALDO CANTANI (NAPLES).

ANTIPYRESIS.

FEVER has ever been the chief object of medical observation and investigation. It has nearly always been considered the essential manifestation of disease, and many fevers are even considered to be the essence of these diseases. It is only recently that it has been generally recognized as a symptom in all cases. We therefore no longer speak of essential fevers.

It is indeed not easy to give a satisfactory definition of fever. In fact, I am free to confess that the theory which would base the entire febrile process on the working of certain nerve centres does not satisfy me, in spite of the experiments on animals on which it is founded and the influence of certain shot-wounds in the head. The so-frequently-observed post-mortem rise of temperature proves that we are concerned not only with the action of heat centres, but with local heat production in the tissues themselves as the result and effect of chemical processes of combustion; as after death not alone has every innervation ceased, but also the entire circulation, and the local increase of temperature can only find its cause in the local increased heat production.

The increase of temperature—in fact, the entire heat production—even in healthy individuals, is not entirely dependent upon certain heat centres. The heat production is manifested in the entire body, in all tissues, especially in the muscles, even if we admit that nervous influences from definite higher centres are capable of elevating the bodily temperature. But just as the piqûre (Bernard's diabetic puncture of the fourth ventricle) only produces a temporary glycosuria, and not a permanent diabetes, so the action of definite nervous centres can only bring about a transitory increase of temperature, but not a permanent or an intermittent fever.

Fever must be regarded as an acute alteration and acceleration of the organic metabolism with increase of the tissue

combustion, and thereby of the heat production and of the bodily waste.

In certain fevers more heat is also retained, but its increased formation, the greater consumption of oxygen, the heightened combustion, are at all events the chief factors of the febrile process. Even the higher regulation of the bodily heat is not intrusted to individual hypothetical nerve centres. It is probably regulated by the whole body, and especially by the entire nervous system, the vaso-motor nerves, and thereby the cutaneous arterial system, being included. But the body always offers an excess of fuel, and it is its quicker consumption and its increased combustion which is the essential source of the greater heat production in fever patients.

Clinically it is beyond doubt that all fevers do not call the fuel of the body into requisition in the same manner and in the same amount. It appears that in some fevers certain bodily tissues, in others, other parts are attacked, consumed, and used up, and this probably depends on the variety of the infecting microbes. Only in this way can we explain the fact that the results of the febrile process are so different in the various diseases. Thus in malarial fevers and also in acute articular rheumatism the red blood-cells are destroyed in large numbers; hence the convalescent patients remain markedly anæmic. So also the muscular system is especially attacked in typhoid fever, and secondarily at the same time the nervous system; hence the patient becomes exceedingly weak and emaciated, and the excretion of the waste products continues and may even be relatively higher in the first week of convalescence. The bodily weight suffers in a corresponding ratio. In tuberculosis all tissues and organs are generally attacked, the whole body wastes, even the heart becomes smaller and the vessels narrower; only the nervous system is often very well preserved, and in some cases of hectic fever seems to be unaffected; the patient frequently retains all his nervous activity, can continue his intellectual work, makes plans for the future, goes about to the very last, and often dies while on a journey. There are also fevers in which there is a greater bodily waste at a low temperature than there is in others at a higher fever. Finally, there are also fevers like that observed several years ago in Southern Italy, which run their course without any demonstrable lesion in any organ,

excepting a swelling of the spleen. With remissions and occasional intermissions, with moderate and at times with high fever, they run their course for weeks and even months without any corresponding effect on the general organism, as the bodily weight does not sink much more than would be expected with the more or less restricted diet. Thus we have a fever in which the organic albumin is for the most part spared, and only the circulating albumin is consumed.

Thus common to all fevers is this factor, that in them the bodily tissues are more or less attacked and used up, and as the indication to lessen the tissue waste is certainly very rational, so one of the most important duties of the physician seems to be the lessening and, if possible, the complete subjugation of the fever, the most important cause of the increased consumption.

We may attempt to attain this object in two different ways: by abstracting heat or by lessening the heat formation.

Abstracting heat does not mean combating the fever or lessening the bodily waste or saving the tissues; it resolves itself into a refreshing of the surface of the body, into an increased radiation of heat. Actually it is more or less a symptomatic resource which avails against the fever itself, but not against the increased combustion at the expense of the body.

Hence it was naturally supposed that everything was accomplished if one or several remedies could be discovered or devised which could annihilate the febrile process, lessen the increased heat production, and diminish the febrile tissue waste.

The indication was found in quinine, the antipyretic of many countries, the febrifuge par excellence. But the usual doses of quinine are not sufficient for all fevers; while they are ample for most varieties of malarial fever, yet they failed in the various other fevers, as for example in acute articular rheumatism, pneumonia, and typhoid fever. It was thus customary to give quite large doses of quinine, and as these could control the pernicious intermittent fevers, so it was thought that it would be possible to subdue the other obstinate varieties of fever. Hence large doses of quinine were used in all infectious and inflammatory diseases, and were even recommended in the septic fevers. But even if it was possible in this way to reduce the temperature of the patient before severe

cinchonism had been reached, yet it became evident that these large doses of quinine did not save the patient, and did not even exert a favorable influence on the course of the disease; in fact, that they only diminished the over-production of heat by lessening the vegetative activity of the organism.

So also digitalis, the remedy lessening the pulse frequency in cardiac patients, came into use and was favorably reported in fevers. The increased frequency of the pulse is indeed one of the most prominent fever symptoms, and if the doses suitable to cardiac patients do not suffice to accomplish this purpose in febrile conditions, yet with large doses it is possible not alone to lessen the frequency of the pulse, but also to lessen the fever. Yet in spite of this symptomatic success no good is done the patient, since these doses only lessen the combustion of the body by poisoning the organism to a greater or less degree and thereby depressing its vegetative activity.

Investigators succeeded in discovering better antipyretics, and in turn came salicylic acid, carbolic acid, kairine, thalline, antipyrine, phenacetine, and the like. With all these remedies we can diminish the fever and pulse frequency of the febrile patient—that is, we relieve the most important fever symptoms.

It is by no means easy to say how these antipyretics really act; in fact, it seems impossible to follow their action in detail. According to one, they lessen the heat production; according to another, they increase its radiation. Still others claim that they paralyze the fever ferments, and finally they are said to simply place the heat regulation on a lower plane. But such a paralyzing of the fever ferments can only be expected of remedies which have a specific action against the living disease germs, like quinine against malaria, carbolic acid against septic wounds, etc.; the other antipyretics are not also antiseptics. The degrading of the fever regulation in febrile patients is an ingenious conception, but evidently is only a simple hypothesis which cannot be verified. On the other hand, the increased radiation of heat is certainly produced by these agents, since the cutaneous vessels are dilated and a more or less profuse sweating may be produced. But besides the increased loss of heat by these remedies, there is also certainly a lessening of the heat production, which is un-

doubtedly the case where a somewhat larger dose is given (or even a normal dose is administered during spontaneous deferescence) and collapse results. It can also not be excluded from ordinary fever cases where the temperature has been depressed by antipyretics, because in order that an antipyretic should lower the heat production by lessening the vegetative activity, it is not necessary that a weakness of the pulse and a lowering of the arterial tension should occur.

The antipyretics, therefore, prevail over one of the chief febrile symptoms, the higher temperature, partly by increased radiation, partly by lessened heat-formation.

Such being their action, are they advantageous to the patient? Can or do they not directly injure him? These are the questions which must present themselves to-day to the intelligent physician, and they cannot be answered without at the same time considering other questions which relate to the fever itself. They are the following:

What really is fever in a disease and what relation does it bear to the same?

Does the fever constitute the real danger to the patient?

Can there exist remedies against the febrile process itself, when the diseases accompanied by fever and their etiology differ so among themselves?

And on what does it really depend that different remedies in different diseases subdue the fever almost with certainty, and at the same time determine the happy termination of the disease, while they are of little or no value in other varieties of fever; whereas other remedies, although they lessen the fever, yet exert no influence on the course of the disease and may even directly injure the patient?

To what should rational antipyresis restrict itself, to what limits may it be extended?

Fever is above all an accompaniment, indeed, a symptom, of so many and such various acute maladies, just as dyspnœa and cough are present in so many diseases of the respiratory tract, and dyspepsia and diarrhœa in such a variety of disturbances of the digestive apparatus.

Fever and inflammation bear the same relation to the diseased organism. They are the direct and immediate results of a disease. The body does not become diseased unless a material cause disturbs either its vitality as a whole or the

individual organs, tissues, or groups of cells. To-day we can also say that such disturbing influences—at least in general—are not found in a refreshing breeze, a cooling drink of cold water, or a rain-shower. All these chillings, which, as far as their influence on the general organism is concerned, are nothing as compared to a hot vapor bath with subsequent ice-cold douches, owe their importance chiefly to the fact that the organism during the stage of incubation of certain acute diseases has acquired such a thermal hyperæsthesia of the skin that the slightest draught, the least withdrawal of heat, even the cool bedclothes on retiring to bed, at once produce a chilliness in the body, and often even a true rigor, as a result of the contraction of the cutaneous arterioles which ushers in the febrile process, and the breaking out of the fully-incubated catarrh or rheumatism. How often has the same person been exposed to much severer chillings without any harm resulting, because at that time he was not predisposed to fever, *i.e.*, the disease-producing substances, the true causes of the catarrhs, pneumonia, pleurisy, nephritis, meningitis, were not in a stage of incubation. But at other times the resistance of the body, shattered by sheltering the living disease germs, needed only a slight insult, perchance an innocent breath of air, to permit the breaking out of the disease, and to announce this beginning with a chill to give a signal of reaction against the invading host.

Disease is for us the expression of the necessary combat of the organism against the cause of the disease, which is in most cases a pathogenic micro-organism, less frequently a chemical substance or a traumatism (the latter probably requiring the intervention of a chemical or a microbiotic influence).

Inflammation is the local reaction of the affected tissue against the cause of disease acting on that area; fever is the general reaction of the whole body to the changes caused in the general metabolism and the circulation by the pathogenic factor.

This reaction is the stipulation of recovery. Without reaction—*i.e.*, without inflammation or without fever—the body would be compelled to surrender without mercy to the hostile influence, as actually occurs in certain cases of very acute septic infection, or in hemorrhagic small-pox, and in other very

acute infections in which the too intense and too rapid blood-poisoning render all reaction impossible by paralyzing the vital forces, and directly lead to a fatal collapse. Without reaction on the part of the attacked organism against its antagonist, the living disease germs would produce such changes in the bodily tissues, would so alter the blood in its circulation, that the continuance of life, not to speak of recovery, would be impossible. The entire restorative power of nature, every spontaneous recovery, the resolution of pneumonia, typhoid fever, influenza, dengue—all these depend on this reaction of the entire organism against the invading micro-organisms. It is a struggle for existence between these two; and where the microbe is victorious, the patient's death-sentence has been determined; where the patient conquers the microbe, the parasite is rendered innocuous, at times overwhelmed and for the most part cast out.

Thus fever is only a sign of reaction, a measure on the one hand of the intensity of the infection, and, on the other, of the reactive power of the organism.

The infection may from the beginning find poor quarters as a result of the lessened predisposition of the organism, so also its intensity may soon be lessened; in both these cases the fever will remain low, because the infection is not intense and the organism does not need a stronger reaction. But the infection may also attack the organism so vigorously that its reactive power, too soon paralyzed, can no longer reply with a high fever, or even if it is powerfully reactive and does not respond with marked fever, yet does not succeed in overcoming the living germs and their baneful influence. In both of the latter cases the patient is lost.

But between these two extremes there are many others, and these constitute the great majority, in which the patient reacts with high fever and happily recovers.

The intelligent physician can usually infer from the whole symptomatology of the disease whether the moderate fever is the result of a slight infection, or if it is mild because the reactive power of the organism is paralyzed. In like manner he does not despair of a good result even with very high fever.

It is not the fever, or at least not the fever alone, which constitutes the severity or mildness of a disease. The patient with high fever with well-preserved muscular system, good

expression, normal color of the skin, regular and strong, although frequent pulse, is better off than another who, although the fever is lower, is disproportionally weak, with altered countenance, subicteric discoloration of the conjunctivæ, and weak pulse. In severe cases there is something present besides the fever which causes the gravity of the disease, which threatens to paralyze the vegetative activity of the tissues, which determines the patient's death-sentence in high as well as in mild or even normal temperatures. This above all is the nature of the cause of the fever, the quality and quantity of the invading parasites, and of the poisons which are produced or perhaps also excreted by them in the attacked body. Then there is, finally, the lessened or absent resistance of the organism.

By this we do not mean to say that a very high and especially a continuous fever does not have a serious prognosis. It is certainly the expression of the need of a strong reaction by the system, and is thus the index and measure of the severity of the infection against which the diseased organism must oppose all its forces to protect itself, to react energetically and, if possible, successfully. But, on the one hand, it is certainly not sure that this energetic reaction will suffice to overwhelm the infection, and, on the other, the long duration of the reaction and its coincident tissue waste may exceed the powers of resistance of the patient and may lead to the exhaustion of the reactive force.

The favorable influence of the febrile movement against the infection may be manifested in various ways. The fever may aid the patient: (1) By diminishing the vitality, the propagation, and possibly the virulence of the living germs in the body by the increased temperature of the blood and tissues. (This latter may suffice, as the direct extermination is unnecessary, in fact, is impossible for the majority of these microbes.) (2) By increasing the resistance of the tissues in their phagocytic capacity. (3) By sterilizing more or less the tissues and thus rendering them a less suitable nutritive medium as a result of the modification of the metabolism in fever.

Concerning the influence of febrile temperatures, we note that many pathogenic organisms—as, for example, the tubercle bacillus—bear such temperatures very well, and may even flourish luxuriantly; while other bacteria certainly suffer and

some of their numbers perish, as the spirillum of relapsing fever and the streptococcus of erysipelas. Facial erysipelas with a high temperature—over 40° C. (104° F.)—runs a quicker and more favorable course than wandering erysipelas, which often drags along for months with its regularly low fever.

For certain microbes the increased heat formation may increase the phagocytic activity of tissue elements and also the power of resistance of the tissues. I do not desire to regard the phagocytic theory as being unimpeachable, much less as proven. But if we simply consider the fact of the invasion of the body by so small but so innumerable a cellular host, and if we remember that the body must overcome them if it is not itself to perish, then we must admit that it can combat such enemies with nothing better than its own cellular elements.

It is by no means necessary—in fact, improbable—that the entire battle between the hostile intruders and the body cells is fought out alone by the white blood-cells. Why should not other tissues—cells of mucous membranes, pulmonary cells, connective-tissue cells, etc.—take part? Why must there be a specific phagocyte, just like a standing army, in the body? The whole doctrine of phagocytism has indeed not yet been proven, but it is so natural, from a biological standpoint, so self-evident and obvious, that had it not yet been proposed it certainly must have been so now. And even the arguments which have been advanced against it are not valid. The fact that patients convalescent from infectious diseases give off the germs in a living condition in the excreta only proves that all the bacteria are not destroyed by the cells of the body, a result which must be expected in any form of the phagocytic theory; for the very excretions, from their nature, are one of the resources of the body for freeing itself, even when fever and inflammation do not exist, from the intruding host. Thus if their number is lessened by means of the secretions of the mucous membranes, this becomes one of the body's mode of defence against the enemy, even if the latter is not destroyed or even if the phagocyte and the living bacteria are cast off together. Even Baumgarten's ingenious experiments are not conclusive against the phagocytic theory.

The giant cells with their inclosed tubercle bacilli in tuberculosis, their presence also in syphilis, even if they owe their

origin to the fusion of several phagocytes, and the possibility of a spontaneous cure of tuberculosis of the bones, glands, and of the lungs itself, observed by myself and others—all these corroborate this doctrine, all objections notwithstanding. We must not demand that the body be victorious in every case; we must not extend this theory to all the infectious diseases, nor must we limit too strictly the method in which the cells of the body defend themselves against the enemy. It is indeed not essential that every microbe should be consumed by the cells; their enormous numbers would render this impossible. It is, on the other hand, quite natural that certain microbes should destroy the cells—as, for example, the blood cells—by penetrating into their substance. The alteration in the chemical activity of the affected tissue produced by the febrile process may suffice to lessen the vitality of the attacking microbes.

But the fever itself, by the changes in the general metabolism from which it arises, may cause such alteration of the nutritive medium for many bacteria that, their virulence having been lessened, their further propagation in the body is rendered impossible; that biologically they are rendered sterile, and chemically their ptomaine formation is made harmless. Surely we cannot doubt the possibility that in the febrile metabolism there are produced leucomaines which, not considering the possible germicidal action of certain ptomaines, may lessen the vegetative activity of the microbes. An analogous condition is seen in the increased formation of acids in the muscles and other tissues in fever. The changes in the nutritive medium, combined with the rise of temperature, are certainly not to be undervalued in the curative action of fever.

What fever does as a general reaction of the entire body is also accomplished by inflammation as a local reaction to the local infection which has called it forth, or to the localization of a general infection. In the inflamed tissue we see the emigration of leucocytes which may also have a phagocytic action; we see the temperature reach a higher point than in other parts of the body; we observe a more distinct and more marked formation than elsewhere of abnormal metabolic products and chemical tissue changes which may possibly sterilize the nutritive medium. Thus the defence of the body against the living disease germs is also intrusted to the same means

which the body as a whole uses in the general manifestations of fever. We are, therefore, justified in attributing to inflammation the same reactive power which we have admitted to fever. Inflammation does even more, since the activity of the cells of the body, especially in mucous membranes, provides for the partial elimination of the innumerable bacteria; or by means of connective-tissue proliferation and cicatrization offers an almost insuperable barrier to the advance and extension of the local infection.

Thus fever, like inflammation, may be beneficial, provided the tissue waste is not carried to exhaustion. And that fever does not constitute the chief danger of a disease is proven by our daily experience. It is the febrile, acute diseases which are generally curable, even spontaneously; while the non-febrile, chronic maladies are healed with difficulty or not at all; and the non-febrile, more or less acute disorders have a very high mortality. Disregarding chronic rheumatic and spinal inflammations, it will suffice to mention the experience that the afebrile course of cholera and the feverless beri-beri—examples of acute and chronic infections—cause such an extraordinary loss of life, while typhoid fever, pneumonia, relapsing fever, dengue, and even small-pox under a simple hygienic treatment give much better results; and in the plague itself, according to its observers, there is a chance of recovery where very high fever is present. And what experienced physician has not observed in the convalescence of typhoid fever, that the higher the fever was the more the organism is fortified and rendered resistant against other infections, as if the prolonged and elevated temperature had effected a renovation in the typhoid patient!

And what can we say concerning the fevers lasting only one or two days, whose true nature is still unknown, which pass away without any treatment and leave no trace behind them? Here there are certainly infections from without, from the intestines, from other mucous membranes, since without a cause there can be no effect. But here the body has speedily subjugated the cause of the disease, has rendered impossible its establishment and propagation. Had this been unsuccessful, who can tell what disease might have developed from this ephemeral fever? The multitude of such abortive cases of disease should teach the practising physician something of

the power and the success of the reaction of the body. How many cases of typhoid fever are there in localities where this disease is endemic which are not diagnosed as a result of the typhoid infection, because the physician has not discovered any distinctly characteristic symptoms of typhoid fever and has contented himself with the diagnosis of a rheumatic, catarrhal gastric, "mucous fever," etc.! The laity must be satisfied with this diagnosis, because the physician does not wish or he may not dare to admit that he has not recognized the true pathological condition, especially as it runs so rapid and favorable a course without his interference. How many apparently simple catarrhs of the nose, eyes, and bronchi during the prevalence of an epidemic of measles are abortive cases of measles, and are spread by means of a chance change of wind, as we ourselves have often seen measles conveyed to places hitherto free from the disease, even to an island! And what shall we say of so many hyperemias of the pharynx with mild fever during an epidemic of diphtheria or scarlet fever, often accompanied later on with albumin in the urine? What shall we say of the simple variolous pharyngitis during an epidemic of small-pox? What conclusions shall we draw from these facts concerning the difficulty or impossibility of preventing the spread of certain infectious diseases, which are so often disseminated and spread over large areas through the railroads by these apparently innocent cases, because they are abortive and not to be diagnosticated?

In these aborted cases of infectious diseases the ephemeral fever is the only sign of warning given by the attacked organism. Nothing results because the body soon subdues its antagonist, and it is beyond doubt that this is due to its prompt and energetic reaction.

We should, therefore, not wish to lessen or annihilate the fever. We may dispute whether fever is a local reaction of certain nerve centres or a general reaction of all or a majority of the tissue elements of the body. But as a function of reaction against the cause of disease, we must consider it to a certain degree beneficial when the hostile microbes have gained access to the system. It would be far better to search for remedies which will render the fever itself useless and superfluous to the patient, by annihilating or at least rendering innocuous to the body the cause and excitant of the fever, the disease gerin.

Such, indeed, is the mode of action of quinine in malarial fevers, of mercury in syphilitic fever. But taken in a strict sense they are not true antipyretics; they are useless against other fevers; and even in malaria and syphilis they abate the fever, not because they are antipyretics, not because they can depress the bodily temperature and can restore the febrile metabolism to its normal condition, but because they abolish the action of the specific cause of a specific fever, *i.e.*, the fever itself.

And in fact quinine not alone cures malarial fevers and the irregular febrile movement dependent on malarial infection, but it also reduces malarial enlargements of the spleen which exist without fever, and eliminates the non-febrile paludal cachexia.

Quinine operates in malarial fever just as Lister's antiseptic method acts in traumatic fever, in septico-pyæmia; as carbolic acid and corrosive sublimate act when applied to the surface of a septic wound or injected into infected channels; as the frequent antiseptic douching of the vagina before, and of the uterus itself after, labor directly prevent puerperal fever. This is the etiological treatment of fever—not treatment of temperature, not a combating of the febrile process.

But such is not the mode of operation of all the antipyretics, or better named “antithermics,” which are intended to replace quinine—in fact, to far surpass it as general fever remedies. Kairine, thalline, antipyrine, phenacetine exert no specific action on the cause of the fever; they depress the temperature partly by increasing the radiation of heat, but chiefly by lessening the heat production.

In this way they can only do harm, inasmuch as, without attacking its cause, they merely interrupt the course of the fever, the reaction of the resisting system against the cause of the fever; so long as their action continues they destroy, or at least lessen, the defensive resources of the attacked organism. They can depress the temperature and with it the febrile metabolism; they can, moreover, lower the increased excretion of urine itself by means of this lessened combustion of the tissues. Nevertheless they are of no benefit to the patient. Even in those cases where we have to deal with germs which thrive at the highest febrile temperatures and which resist all phagocytic action, even in these cases the

hope remains—and possibly the best established of all—that the alteration of the metabolism and the change in the culture medium brought about by the pyrexia will set a limit to the further progress of the pathogenic microbes. This invaluable result of the reaction of the body to fever is entirely lost by the employment of antipyretics or “antithermics” which reduce the temperature at any cost.

Rationally we ought not to allow ourselves to be carried away by the hope that by artificially depressing the heat production we can bring the febrile process to a stand-still. A diminution of the heat production is inconceivable without a similar diminution of the vitality of the organism and of its capacity for reaction and resistance. This, however, means poisoning. The degree of poisoning by means of which these results are attained is, of course, relatively trifling, inasmuch as the important vital nerve centres are spared; but it is nevertheless a form of poisoning, and if we meet very susceptible patients, if we administer excessive doses, or if we prescribe but moderate doses during the occurrence of a normal defervescence (as in pneumonia), we may observe dangerous symptoms of collapse, as has occurred in my own experience. In such cases the poisoning is evident; in the others it also occurs, but it only partially affects the activity of the heat production.

It is obvious that we can only advantageously combat fever with such remedies as do not attack the result of the fever, the increased heat production, but its cause, the excitant of the fever, as quinine does in malaria.

Bearing in mind the diversity of the pathogenic microbes which cause the various infectious diseases and the diversity of their reaction to germicidal and disinfecting remedies, it becomes evident that we must relinquish the idea of having or hoping to find such a remedy which will be efficacious in all infections and thus against all fevers, and at the same time be well borne by the patient. There are indeed disinfectants, sovereign poisons to every living animal and plant, remedies which destroy all bacteria, such as corrosive sublimate, carbolic acid, etc.; but, alas! in the doses which are necessary to kill the intruding bacteria they will much sooner destroy the life of the patient.

The problem is, therefore, to find remedies which, like

quinine in malaria and mercury in syphilis, administered in doses capable of being borne by the patient, will, if they do not kill the disease germs, at least render them innocuous. On science devolves the task of discovering such specific for the various infections, even though such discoveries be the result of chance. Then will the fevers of all the infections be rationally combated and subdued. In other words, we will then not subdue the febrile process, but we will render the pyrexia useless and spare the system its febrile reaction by disarming the disease germ, the excitant of the fever.

It is not impossible that among the antipyretics already discovered or devised, as well as among those yet to be announced, there may be one or more which will prove to be specific in certain infections and their accompanying fevers. But surely for the manifold varieties of disease germs there will be a number of specific remedies needed; a universal antipyretic which, while harmless to the patient, will render all excitants of fever equally inert, will, alas! always remain a vain hope.

But the matter assumes a different aspect when we consider the question whether in all cases a high fever only exerts an absolutely curative influence; whether under certain conditions more harm than good may not be done by the too elevated temperature; whether the accumulation of the heat produced in the body may not possibly be the cause of subsequent injury.

And here we must admit that an excessive accumulation of high temperature may debilitate the heart's action to too great an extent, may imperil the nerve centres, and to meet this danger a diminution of the excessive temperature may theoretically seem desirable. And this purpose may be accomplished theoretically by abstracting heat, without lessening the heat production itself, by cooling the heated body without influencing the further production of the reactive temperature.

For this purpose we may use the various hydro-therapeutic measures: the cold full bath, cold packs or cold affusions, and also baths either of lukewarm or running water, or of water which has been gradually cooled, etc. To a certain extent large draughts of cold water or high rectal enemata may also be of service.

It has been proven of all these methods that they deprive the body of large quantities of heat which is given up to the cold water, while at the same time they do not diminish, but rather increase, the heat production in the body. Recalling the fact which has been proved by Liebermeister and of which any one may convince himself, that during such abstractions of heat the axillary temperature does not sink, while the periphery gives off seven times more heat than is lost in ordinary clothing, we must infer that such abstractions of heat necessarily increase the production to a very remarkable degree.

The conclusion naturally following these considerations is that the heat abstraction, with its consequent cooling of the body, is of benefit only to a portion—the surface, of the body—and that the actual heat production is stimulated because of this abstraction.

These abstractions of heat thus aid the fever, in that although they cool off the body to a certain extent, yet taken all in all they nevertheless increase still further the combustion and tissue waste which has already been accelerated by the fever.

While theoretically they are to be condemned from the standpoint of a reduction of the temperature, yet practically they are to be commended for their favorable influence on the course of the disease.

And here the question naturally arises: Does the beneficial effect of these heat abstractions consist in their cooling action, or may it not perhaps be due to the increase of the febrile heat generation and of the combustion and waste of the tissues—in other words, because they increase the effects of the fever? May not the forced combustion produce still greater changes in the tissues and thus render them an even more unfavorable nidus for the germs than the fever has rendered them? Is it not the resulting highly-increased excretion of so many excrementitious substances—ptomaines, leucomaines—which diminishes the chemical poisoning in the circulation of the blood and in the tissues? May it not perchance be due to the increased combustion of the bodily tissues and of the blood which, thanks to the definite regulation of the temperature, is made possible by heat-abstraction, without causing the body to suffer by an excessive accumulation of heat, with-

out elevating the temperature to a degree which could not be borne by the heart and nervous centres?

And if this is the case (I purposely refrain from considering certain secondary results of the action of cold on the surface of the body, as especially all reflex effects, the expectorant action of cold baths in pneumonia, etc.), how different is the action of the abstraction of heat by cold baths, enteroclysms, etc., from that of the chemical antipyretics, which, even if they partly increase the loss of heat, nevertheless act chiefly by depressing the heat generation, thus leading frequently to collapse and algidity.

But the cold full bath, if used in cases of cardiac weakness or diminished power of reaction, is also capable of causing collapse by exhausting the heat production. It is just here that, owing to the excessive exertion of the body to replace the abstracted heat by increased combustion and accelerated consumption, for which purpose the enfeebled patient does not possess the means, and owing to the deficit in the economy, that the heat generation becomes exhausted.

With the antipyretics, on the other hand, it is the directly depressing impression made on the heat production, the directly hostile grasp on the chemical vital processes, which leads to collapse.

In the one case it is a transient increase, in the other a transient decrease, which comes into play. The former aids the fever reaction of the body in its ultimate purpose, the latter suppresses the reaction against the cause of the fever.

And if after the cessation of the mild heat abstractions the axillary temperature falls a trifle after a while, and this fall lasts but a few hours, the cause is no doubt to be found in the fact that the mild increase of the heat generation manifested during the mild heat abstraction (in behalf of the febrile balance of temperature) ceases sooner than does the increase in the radiation from the cooled surface; so that after the forced augmentation of the heat generation has ceased more heat is lost than is produced, because the body becomes accustomed, as it were, to the greater radiation and continues to give off more heat. Under such circumstances the radiation becomes a real cooling of the feverish body without depressing the reaction against the cause of the disease, without depressing the heat production, and without exhausting its

source. There is thus nothing in common between the cooling after-effect of the moderate heat withdrawals and the depressing effect of the chemical antipyretics.

The moderate abstraction of heat with cooling after-effect may be very easily accomplished by cool sponging, by cold packs, by not too cold full baths, by baths lukewarm at first, but rendered colder by the gradual addition of cold water. Thus the radiation of heat from the body to the water of the bath is not alone compensated and the heat abstraction continued at a certain degree, but also gradually increased.

This same effect may also be produced more completely, and by all means more safely, by means of cold enteroclysms, with which in all cases, and especially in typhoid fever, we could observe a slow but steady diminution for several hours in the axillary temperature. This effect is also very much facilitated by very copious draughts of cold water in typhus fever, in which by the daily consumption of five to six (eleven to thirteen) and in some cases of even ten to fourteen litres (twenty-two to thirty pints) of cold water, we regularly succeeded in causing defervescence while the eruption was still in full bloom.

Here the fact certainly deserves mention that certain diseases accompanied with high fever run a very favorable course when treated by means of diaphoretics and are much benefited by this mode of treatment, even though it is so unlike the abstraction of heat by means of cold. We will not speak here of the so-called acute articular rheumatism, nor of certain acute catarrhal affections in which, while resolving spontaneously without any special interference on the part of the physician, the body perspires so easily and so much. We shall simply recall pneumonia, which progresses just as well, and in some epidemics even better, with warm poultices as under cold-water treatment. But is not the profuse sweating of a patient a variety of heat abstraction? Does not the perspiring body radiate more heat at the periphery than when dry? Is not diaphoresis a compensatory method to lessen the accumulation of heat in the body?

It is indeed beyond doubt that the diaphoretic method, disregarding the increased excretion of noxious substances, is really a kind of heat abstraction which does not increase the production of heat, or at all events increases it less than does

the cold method. But generally the diaphoretic method is not applicable in all kinds of fever. In many cases in which it may be useful it certainly does less good than the cold method—possibly because it does not increase the heat production in the febrile patient, or increase it as much as the latter, and that it only facilitates the radiation of heat which has been accumulated by keeping the patient too warm. In this seems to be the chief difference between the two methods, which are both based on heat abstraction.

Let us also remember that, taken all in all, there is less curative action in the moderate abstractions of heat, which maintain the internal temperature to a lower degree and, therefore, do not increase the heat formation so much, than in the large withdrawals of heat. From this we infer that in the abstraction of heat the most beneficial effect is exerted on the patient not so much by the manifest cooling of the surface as by just the reverse—*i.e.*, the greater combustion of the body with the consequent effect on the general metabolism and the locally infected nutritive medium. However paradoxical this statement may appear, it is nevertheless warranted if, on the one hand, we consider clinical results, which are of vastly greater service to the physician than mere bald theory, and, on the other hand, if we estimate the very extraordinary increase of heat radiation in the cold bath as compared to the maintenance of the internal temperature, which could not be kept at the same degree without a considerable corresponding increased heat formation.

The cardinal difference between the hydropathic abstraction of heat and the depression of fever by chemical antipyretics lies, in my opinion, in the fact that the former increases the generation of heat, while the latter diminishes it; that the former permits the springs of the heat formation to flow more freely, while the latter dries them up.

The two antipyretic methods are, therefore, directly opposed to each other; and it must be admitted that impartial clinical experience may cheerfully value the one as useful, while it recognizes that the other may possibly be injurious.

Bearing this in mind, we find that fever itself is not the chief danger in a disease; on the contrary, it is necessary and, to a certain degree, a sign of the curative reaction in acute disorders. We therefore have no reason for desiring to re-

duce the fever as such. If certain remedies can almost with certainty subdue certain fevers and thus restore the patient's health, this is owing to the fact that these remedies contend not with the febrile process itself, but with the cause of the same. They thus act as specific germicides.

General antipyretics which are successful in every variety of fever do not as yet exist; and there never will be found a remedy which can successfully act on the manifold causes of fever and the variously reacting and resisting disease germs without at the same time injuring the patient. We must, therefore, restrict ourselves to lessening the accumulation of heat in febrile patients without lowering the heat generation itself—*i.e.*, the reaction. Hence hydropathic measures will always be desirable, while all chemical antipyretics will appear untrustworthy as general febrifuges.

Hence, if in general we do not wish to treat diseases accompanied by fever (which, it may be remarked, are collectively the acute infections) with the fashionable antipyretics and antithermic remedies of the chemical laboratories and drug-shops; if we prefer waiting and an equalization of the natural vital processes of the attacked organism to a direct antipyretic therapy in these diseases in which we possess no specific remedy against the causal factor, yet we do not wish to pose as a therapeutic nihilist. Therapeutic nihilism has had its day. It certainly rendered the invaluable service of having in a time of scientific barrenness destroyed the illusions of allopathy, of having explained the apparent miracles of homœopathy, and of having buried both of these two systems which ignore all natural agencies. It is to this therapeutic nihilism that we owe the recognition of the great power of natural recovery and the resisting capacity and the power of reaction of the organism.

To-day we are no longer allopaths, just as we could not be homœopaths. But neither are we any longer nihilists; we are simply physicians of nature—"physio-therapeutists" who highly value the etiological standpoint, especially the causes of disease, who pay special attention to the excitants of disease themselves, and where this is impossible anticipate their effects, and who follow the old doctrine of Hippocrates: "*Quo natura vergit, eo tendere oportet.*" To-day we study the spontaneous resolution of diseases, and the knowledge thus gained

becomes an index to us for the rational method of treatment where we are unable to eliminate the cause of the disease itself.

The nihilism of the highly-esteemed Vienna school certainly was carried too far, and threatened to throw overboard the entire apothecary. This caused a reaction among experienced therapeutists, and the reaction was desirable and necessary. But unfortunately even it gradually went too far, and in league with all-powerful fashion, there resulted the present searching after new remedies, the over-estimation of experiments on animals, the over-valuation of purely symptomatic successes. It is this same spirit which threatens to again call into existence the old allopathy, an allopathy, it is true, as yet without venesection and with fewer vesicants than formerly, yet none the less an allopathy which in its methods of treatment pays more attention to the manifestations rather than the causes of disease, and which disregards the resources of the diseased organism which it may itself utilize to vanquish the disease and again restore health.

It is our duty as modern "natural physicians" to investigate thoroughly the necessary conditions which lead to spontaneous recovery, so that we may be sure that we may not render the recovery more difficult, if not doubtful. In this way only can we fulfil the first duty of the conscientious physician, not to do harm; the second duty, to assist, will then perchance be also rendered possible by this proper estimation of all the necessary conditions.

Let us, therefore, refrain from desiring at any cost to reduce the fever which in so many diseases is the physician's staunchest ally; let us rather strive to combat it in its causes and spare this necessary process to the patient. The tendency to search for general antipyretics to treat the febrile process as such without acting on its cause is a lamentable step backward in rational therapeutics. Against this abuse of such remedies we need only call attention, and in this connection it is certainly interesting to note that the conviction of the possible value of the fever is a very old one. Let us bear in mind the words of Boerhaave: "*Quid est febris? Est naturæ irritatæ conamen ad expellendum stimulum inconsuetum,*" and the aphorism of Borsieri: "*Quos interdum morbos remedia non curant, febris curat.*"

SOME
URINARY DISORDERS

CONNECTED WITH

The Bladder, Prostate, and Urethra.

BY

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SOME URINARY DISORDERS.

CHAPTER · 1.

THE PREVENTION AND EARLY TREATMENT OF PROSTATIC OBSTRUCTION.

IN the course of lectures that is before us this month I hope to elaborate certain points connected with the diseases of the urinary organs which appear to me to be worthy of your consideration. It will be my endeavor to make these meetings gatherings for clinical objects rather than for the purpose of attempting any systematic description of the subjects to which they relate. With this view I shall be happy, as occasion offers, to supplement what I may have to say here by the ordinary work of the hospital as seen in the wards, and on my out-patient days.

Without occupying your time by any further prefatory remarks, I will proceed with the subject selected for to-day's consideration, viz., the prevention and early treatment of prostatic obstruction. And I must ask you to notice in the first place that I do not say the prevention and treatment of the enlarged or hypertrophied prostate, as I purposely confine myself to dealing with almost the only symptom, and that the most pressing one, which brings the enlarged prostate under the notice of the medical practitioner. Enlargement of the prostate to some degree is, I might say, the common lot of by far the greater majority of males who have attained sixty years of age or upward, being, I believe, far more frequent than what at first sight we might perhaps be disposed to admit. Not very long ago for the purpose of ascertaining this point I took the trouble to examine consecutively one hundred males who had reached their sixtieth year or upward, and out of these three-fourths presented undoubted signs by

rectal examination of this change. Of the number thus affected not one-fifth of them appeared in any way inconvenienced thereby, some to so slight an extent as not to complain. Nor are there grounds for asserting that because a person has an enlarged prostate a time will come, should he live long enough, when bladder trouble must necessarily supervene. I have watched many men with well-marked signs of an enlarged prostate for a number of years, and up to the time of their deaths, either by natural decay or by other diseases, without knowing them to be conscious of any inability so far as their urinary organs were concerned. But though persons may, either by good care, or good fortune, obtain an immunity from those troubles which prostatic enlargement not infrequently brings with it, there can be no doubt that they carry with them to the end of their lives the liability to suffer in a way which does not apply to those who have not undergone this structural change, a liability which may show itself without any sufficient notice or warning. It not infrequently happens, as we all know, that a sudden attack of retention of urine, probably traceable to some definite cause which might have been avoided, is the first indication that an elderly man has an enlarged prostate. As a matter of practice it is as an obstacle to micturition that the prostate comes under our notice as surgeons, and this for the most part shows itself, at all events to persons accustomed to observe, by gradual indications rather than by the sudden and unwarned cessation of the physical function of micturition. In far the larger number of cases, even in those where apparently the urinary breakdown is sudden and unexpected, and where the prostate eventually proves to be a serious cause of obstruction, the process is a gradual one, and is not unlike what is commonly observed in connection with other obstructive diseases of the urinary apparatus. Hence I consider that with our present knowledge, and in face of the facts to which I have briefly referred, we, as practitioners, will do best by approaching the subject in relation to obstruction rather than in reference to a mere increment in bulk of which the individuals may never be conscious.

These cases, however, of much enlarged prostates unattended by symptoms of such a kind as to constitute disease, have been of great interest to me, and the study of them led

me some years ago to suggest certain lines of action in practice which seem to me to have yielded some excellent results.

In a number of specimens of this kind it was impossible not to notice that the form assumed by the prostatic growth relative to the outlet from the bladder exercised a considerable influence in determining the presence or absence of symptoms of urinary obstruction. In some forms of enlarged prostate, though the growth was not excessive, the obstacle to micturition was most complete, while in others, though the mass attained a very considerable size, it was quite apparent how it happened that the expulsion of urine from the bladder was so little interfered with. By the kindness of my friend, Professor A. Barron, I am able to bring under your notice to-day an example about which I attach considerable importance in reference to this special point I am now addressing you upon, and I attach this importance to it chiefly on two grounds (1) because it illustrates how it is that the process of micturition need not necessarily be interfered with by the growth of the prostate, and (2) because it shows a natural adaptation of the parts which I shall endeavor to demonstrate to you, is capable of being imitated.

The specimen you will see is one of considerable enlargement of the prostate; it is taken from a middle-aged man about whose exact age there seems to be some doubt, but who probably was rather under than over that period of life when this change usually commences. He was under observation for eleven days before he died; he had never suffered from any difficulty in urinating, though the act of micturition was more frequently performed than is usual with persons at his time of life. If we look at the specimen, we can at once see how it was that, in spite of the general enlargement, there was no marked impediment to the escape of urine along the urethra. You will notice that what is known by the somewhat incorrect term, as the middle lobe, is deeply grooved in the centre so as to give a bi-lobed appearance to the part. Having frequently noticed this process of channelling or grooving in connection with those cases of enlarged prostates where micturition was not interfered with, in 1881 I drew attention to this point with the view of showing that it was capable of being artificially produced with permanent advantage to the patient.

About that time a case came under my notice which seemed

to confirm the views I was then putting into practice. It was that of an elderly gentleman, well known to me, who, in the belief that he had an enlarging prostate, of his own will and idea took means which seemed to him would be likely to prevent the occurrence of retention of urine. Long before I knew him he had been told that his slight urinary troubles were the early indications of an obstructing prostate, and that he might find himself on some occasion unable to micturate. This so alarmed him that for many years, and almost up to the time of his death at an advanced age, and from other causes, he never allowed a day to go by without passing a full-sized bougie for himself. He remained quite free from any urinary inconvenience, a circumstance which was attributed by him to the means he had adopted. I made a post-mortem examination of him, and found that though the middle lobe of his prostate was considerably enlarged, the level and distensibility of the prostatic urethra were in no way altered, the growth or enlargement being deeply grooved. It appeared, to use the phrase of my patient, that the "maintenance of the water way" was directly traceable to the persistent catheterism that had been most gently and effectually performed. In the further extension of this practice my object has been to mould the growing prostate, and not to endeavor to dilate it, or to procure its absorption as had previously been done by Mercier, Physick, Skey, and other surgeons.

When there is evidence that the prostate, by its increased bulk, is beginning to obstruct micturition, when we endeavor to supplement an imperfect action of the bladder by repeated trials and failures, or when the residual urine which in some degree is nearly always a concomitant with an enlarged prostate is seriously harmful to the individuals either by its quantity or quality, then mechanical treatment in the direction I have indicated may often be resorted to with great and permanent advantage. But there are other grounds except those immediately connected with the function of the bladder, which seem to force upon us the importance of the mechanical treatment of prostatic obstruction at a far earlier date in its history than has hitherto been generally practised. Take the evidence that is afforded by the state of the urinary organs above, namely, the bladder, the ureters, and the kidneys, as

showing what the back pressure of the urine in some cases of prostatic obstruction is capable of effecting. In the post-mortem record of the specimen I have just shown you, where during life there was no reason for suspecting that any appreciable degree of obstruction existed, it is stated "the kidneys were fibroid and atrophied, the two weighing ten ounces, many small subcapsular cysts, early hydronephrosis, no pyelitis. Ureters dilated, bladder dilated and fasciculated." Supposing a surgeon accustomed to see the pathological effects connected with urethral stricture had a specimen of this kind before him in an instance of the latter disorder, I can imagine him saying to his class "here we have an illustration of the enormous and fatal damage that urine pressure is capable of exercising on the important parts above a stricture; these results are in their nature entirely due to mechanical causes, and might have been prevented had means been taken sufficiently early."

Apart, however, from this consideration, it is important to notice what an unfortunate condition of the organs is presented should in the course of the prostatic disorder retention of urine attended with cystitis, as is often the case, supervene. We have the whole of the urinary apparatus from the kidneys downward laid open as it were to the influence of an inflammatory attack of a most putrid character. Can we wonder that what is commonly called a surgical kidney is one of the most natural results?

But though the more remote consequences of prostatic obstruction are for the most part analogous with those observed in connection with urethral stricture, little seems to have been done to prevent their occurrence. This appears to have been due in a large measure to our failing to recognize the possibility of maintaining in spite of overgrowth a prostatic channel for the escape of urine from the bladder quite as efficient, as I have endeavored to show, nature herself frequently provides, and which is not liable to that kind of contraction which nearly all strictures constantly undergo. In the next place our forefathers were ill provided with instruments adapted for such purposes, the old metal long curved catheter being almost always associated with any prostatic disorder. I do not think we fully appreciate the great improvements that have taken place within comparatively

recent years in the construction of these appliances, and the comfort that has been conferred on those requiring such assistance.

Frequency of micturition may oftener be regarded as a sign that the prostate is commencing to obstruct, than any other symptom. As with a urethral stricture a person by the exercise of muscular force will often maintain a very fair stream of urine, though the dimensions of the canal are considerably reduced, so will an individual with a large prostate compensate to a certain point for efficiency by a frequent performance of the act of micturition. Hence it behooves us in all cases where there is an absence of other causes of irritation, such as are presented by stone, tumor, inflammation, or the condition of the urine, to regard frequent micturition in an elderly male, as an indication that he is probably suffering from an early form of prostatic obstruction. The presence of this symptom in an inconvenient degree and in the absence of any other cause such as I have indicated, is sufficient to warrant a physical examination of the suspected part. The discovery of some enlargement of the prostate by exploration of the finger in the rectum is *prima-facie* evidence that the frequency in micturition is merely an indication that the growth is commencing to interfere with the proper performance of micturition. Such being the case, it is hardly necessary to point out that the artificial rest to the part which is frequently obtained by the use of opium and belladonna suppositories, except so far as removing spasm is concerned, is really an interference with an adaptation in the manner of conducting the process of micturition which is essentially associated with the altered physical condition of the parts. If in a system of water works you materially alter the shape and structure of the main valve at the outlet, you can hardly expect that the discharge will be the same as under the previous *régime*.

And now I will proceed to show you by what means we may contrive to improve matters when there is evidence by the symptoms it provokes that the enlarging prostate is assuming a shape where urination is, and will probably continue to be, increasingly obstructed. Having drawn my first illustration from what nature will spontaneously do in reference to this difficulty, I will take a second one from the same source

before I proceed to notice the mechanical contrivances which may, under such circumstances, be used with advantage. Persons with large prostates and who are not inconvenienced by them are quite unconscious of the spontaneous process by which the conservation of their urinating powers is preserved. It is not by a rapid destruction or alteration in tissue consequent on some violent inflammation where, as we sometimes see, a permanent advantage follows, but by the induction of a process of which we are absolutely unconscious, and this fact must be uppermost in our minds, so that we may so guide our efforts as nearly as possible to imitate that which nature does not only with impunity, but with so great and permanent advantage.

With the object I have now in view, I would in the first place say that bougies are, as a rule, to be used and not catheters. I am quite sure that unless there is some special reason for it, it is a great mistake to interfere with that degree of residual urine which is met with in most cases of prostatic obstruction, especially in its early form. What we have to do is to bring about such a conformation of the outlet from the bladder as to render residual urine unnecessary. Apart, however, from this point, which is an important one, it must be remembered that a flexible bougie generally enters the bladder much more easily than any catheter, as the stiffening which the eyes of the latter entail render it less capable of adapting itself to the canal. The special instruments I employ for moulding the prostatic urethra are of three kinds—the whip bougie, the ordinary olive-headed instrument, and the bougies *à ventre*, or bellied bougies, which I first introduced some years ago for this purpose. I prefer the last-mentioned (Fig. 1), in reference to which I can only indorse what I wrote of them nine years ago, ("The Prevention of Stricture and Prostatic Obstruction." 1881). Whatever instrument is selected, care should be taken to ascertain that it can be used easily and without causing pain, as the object in view would thereby be defeated.

The narration of a single case of some years' standing will enable me to complete the particulars which seem to me to be of importance in connection with the modelling treatment of prostatic obstruction. In 1883 a medical man, æt. 62, consulted me for symptoms which he was inclined to attribute to

a stone in the bladder. For some months he had been suffering from extreme irritability both by night and day, and particularly in the morning on rising. He was engaged in an active life, and the urgent desire to micturate every two or three hours became extremely irksome and inconvenient. He had a great dislike to any instrumental interference, and up to the time of my seeing him had refrained to use a catheter, although he had been frequently urged to do so. His habits and modes of life had always been extremely temperate and regular. Examination by the finger in the rectum showed that he had a moderately enlarged prostate. As he wished to be searched for stone, the introduction of the sound showed by the manner in which the handle of the instrument had to be depressed to enter the bladder that the floor of the prostate was very considerably elevated and enlarged. There was no stone nor evidence of any disease except the enlarged prostate. There were about two ounces or rather more of healthy resid-



Fig. 1.

ual urine. Having explained the nature of the case to him, I advised him not to use a catheter, but to accustom himself to the regular introduction of a suitable bougie. To commence with I gave him one of the whip bougies, which I was then introducing into practice, and asked him to pass it every second or third night on going to bed. In the course of three weeks he got quite accustomed to this very simple form of instrumentation, and I then substituted the smallest size bougie *à ventre* or prostatic dilator as previously described. He passed this for himself on going to bed about twice a week, and very gradually increased the size of the instrument by three or four numbers. He reported himself at the end of six months, having persistently carried out this treatment in conjunction with the pursuit of his ordinary business. His condition then was as follows: His propulsive power in urinating had increased, the irritability of the bladder had gradually subsided, the calls to urinate being hardly more frequent than normal, and the amount of residual urine had diminished from rather over two ounces to a little less than four drachms.

Nothing else had been done medicinally except the treatment I have mentioned. I saw this gentleman casually two years afterward, and learnt that he was as well as ever. He told me that he did not think there was the least necessity for using his instrument, but as it was no inconvenience to him he preferred doing so once a week just before going to bed. His urine was acid, and in other respects healthy, and the bladder completely emptied itself.

A useful commentary on this case was suggested to me by the remarks of another medical man to whom I was relating it. "How is it," he said, "that I have not derived a similar benefit? I had to commence the catheter life fifteen years ago, and a day has never gone by since without my passing into my bladder a No. 10 English flexible catheter at least twice in the twenty-four hours." My reply was this: "You did not commence to draw off your urine until atony of the bladder had proceeded so far that you could not get on without this expedient, and when by the regular and persistent use of your catheter nature found out that muscle was not necessary for your act of micturition, either in part or in whole, she ceased to supply it. I have not the least doubt that my friend whose case I have just related would have been in a similar position to yours had we in the first instance supplied him with a catheter instead of a bougie, and told him to go on using it."

Before closing this chapter I should like to make a few remarks in reference to the larger class of cases, namely, those who have hypertrophied prostates but are in no sense inconvenienced by them. As I have said before, a person so circumstanced must be regarded as more liable to some sudden urinary disturbance than one who is not. Hence I have been in the habit of enumerating a few points which in the management of elderly males have proved of service.

1. To avoid being placed under circumstances when the bladder cannot be emptied at will. Nothing is so bad for a large prostate, though it may be working satisfactorily, as an enforced retention. It is often the first cause of a permanent atony.

2. To avoid checking perspiration by exposure to cold, and thus throwing additional work on the kidneys. In climates like our own, elderly persons should, both in summer and winter, wear flannel next the skin.

3. To be sparing of wines and of spirits (if used at all), exercising a marked diuretic effect either by their quantity or quality, select those which promote digestion without palpably affecting the urinary organs. A glass of hot gin and water, or a potent dose of sweet spirits of nitre will not do anything to remove the residual urine behind an enlarged prostate.

4. To be tolerably constant in the quantity of fluids daily consumed. As we grow older our urinary organs become less capable of adapting themselves to extreme variations in excretion. Therefore, it is desirable to keep to that average daily consumption of fluids which experience shows to be sufficient and necessary. How often has some festive occasion, where the average quantity of fluid daily consumed has been largely exceeded, led to the over-distention of a bladder long hovering between competency and incompetency. The retention thus occasioned, by suspending the power of the bladder, has frequently been the first direct step toward establishing a permanent, if not a fatal, condition of atony or paralysis of this organ.

5. It is important that from time to time the reaction of the urine should be noted. When it becomes alkaline or offensive the use of the catheter may be necessary. When a catheter is required it is most important that its selection should not be entirely left to the instrument maker. There are other points to be considered beyond the fact that it is to serve as an artificial outlet for the urine from the bladder. An unsuitable catheter in a prostatic case may do much permanent harm.

6. Some regularity as to the time of performing micturition should be inculcated. We recognize the importance of this in securing a regular and healthy action of the bowels, and though the conditions are not precisely analogous, yet a corresponding advantage will be derived from carrying out the same principle in regard to micturition.

Of the medicines I have found most useful in conjunction with mechanical means in restoring the tone of the bladder, I would mention here the ergot of rye which I generally give in the form of the fluid extract in cinnamon water. Its value in promoting muscular contractility is generally recognized. In my next chapter I shall consider the treatment of some advanced forms of prostatic obstruction.

CHAPTER II.

THE OPERATIVE TREATMENT OF ADVANCED FORMS OF PROSTATIC OBSTRUCTION.

I HAVE selected this subject for our consideration in this chapter, and I would again remind you that I confine myself to dealing with the single symptom of obstruction to micturition, quite independent of any size that the prostate may assume, knowing well that hypertrophy may occur without causing the individual such an amount of inconvenience as to demand surgical interference.

As I have said before, obstruction to micturition may be a process of gradually increasing difficulty, or one suddenly brought about by some casual circumstance which may or may not have been avoided. Whatever may be the mode of its incidence, we frequently meet with persons whose function of micturition is entirely and permanently spoilt by the difficulties and complications attendant upon a large prostate. So long as a person so circumstanced can keep himself comfortable by the use of a catheter, so long as the calls for this instrument are not of such frequent occurrence, both by day and night, as to seriously interfere with his health, or to prevent him earning his subsistence, I do not think that further measures are likely to be called for, unless under very exceptional circumstances. Surgery, however, has to provide not only for the ordinary course that a disease is likely to take, but for all the contingencies to which it is liable. Hence I propose to consider in the first place the conditions to which catheterism alone is inapplicable as failing to give sufficient relief, and secondly, the varieties of relief for such states as surgery offers.

I do not think there is any phase connected with advanced forms of prostatic disease which is more intolerable and wearing to the individual, than that ceaseless desire to evacuate the bladder which is occasionally met with. Yet in practice, instances will come under your notice where the

whole life of the individual both by day and night, is as it were given up to the single act of introducing the catheter. Here the instrument, as a patient once said to me, becomes a Tantalus of the worst form, as not the slightest relief follows its application. Then there are cases where the mechanical act of introducing the catheter is an increasingly difficult one by reason of the obstacle that the growing prostate presents. A patient who has been using a catheter for some time with great advantage finds that he has to select a smaller size, then he tries a different shape, and so he goes on until at last both he and his medical attendant discover that there is always difficulty, whatever kind or size of catheter is used. Then hemorrhage attends these trials, at first occasionally and afterward constantly, and this is frequently followed by cystitis and other complications, among which orchitis may be mentioned. This condition of affairs does not often last long unless some easier mode of evacuating the urine is provided.

In a third class of cases you will find that in the course of its growth a portion of the prostate, in the form of one or more pendulous growths, encroaches upon the interior of the bladder and keeps up a constant state of cystitis, often far in excess of what is seen associated with the most irregular stones. Here the urine is generally loaded with a muco-purulent deposit, in which particles of blood will frequently be noticed. Further if you look at specimens of this kind which will be found in any pathological museum, the ureters will be seen to be patent and largely dilated, evidently showing not only how great the obstruction has been, but how easily the damage may enter the interior of the kidney. What can catheterism and washings-out do for cases coming under this category? Then there are instances of a very exceptional nature where the ordinary modes of treatment are inapplicable. In one case that occurs to me the prostatic urethra became so inordinately sensitive, and the spasm that catheterism excited in the prostatic urethra so great, that the patient actually wore an instrument in his bladder, more or less constantly for over two years. I believe this case was in the first instance one of those rare ones of prostatic fissure, analogous in many respects with what is seen within the anus and the female urethra. I operated upon him three years ago, dividing his prostate, and at the same time removing some secondary phosphatic calculi. He is now

alive and well and though he passes his urine more frequently than natural he has never since had occasion to use a catheter. Though in the majority of instances the advanced forms of prostatic obstruction are arrived at by a process of increasing difficulty in urination, the disease sometimes assumes this position without giving anything which could be spoken of as an adequate warning. Retention of urine, following apparently some trivial cause, suddenly occurs and the practitioner finds himself face to face with one or more of the complications to which I have just referred. There is great difficulty in introducing or reintroducing the catheter by reason of the form the prostate assumes; the retention of an instrument in the bladder is intolerable to the patient, if it is tied in it is withdrawn and all the trouble and pain connected with its reintroduction have to be repeated; or the engorged condition of the parts is attended with hemorrhage which recurs every time instrumentation has to be practised. These are phases of the acute form of obstruction which most practitioners are not only familiar with, but who know from experience how futile catheterism alone has proved under such circumstances.

For the relief of these difficulties, whether occurring gradually or suddenly, various methods of treatment have been practised, to which I shall now refer. In dealing with this part of my subject to-day, I hope I may be pardoned if I do so from a somewhat personal standpoint, as I think it will be seen that I have taken a considerable interest, not entirely in a passive form, in this aspect of the question.

In 1881 I published the particulars of a case where to meet the pressing difficulties connected with an obstructing prostate such as I have just referred to, I adopted an expedient which I believe was entirely novel at the time. I had long felt that the operation of puncturing the bladder from the rectum for retention of urine in cases of an enlarged prostate was one that could only be recommended for a very temporary purpose, inasmuch as it was impossible to retain the tube sufficiently long in such a position as to permit of an adequate degree of bladder drainage being practised with any regard to the comfort of the patient. Nor did the supra-pubic method of puncturing the bladder, and retaining a tube in this position recommend itself to me, chiefly on the grounds that it seemed to me to be neither a convenient spot for the patient,

nor was it sufficiently dependent to secure perfect drainage. With these views in my mind, I determined to puncture the bladder, when the necessity arose, from the perineum through the enlarged prostate, and to retain a drainage-tube in this position as long as might be necessary. In the instance I am now referring to, the patient was a man of 84 years of age, who was much reduced by an advanced form of prostatic obstruction. Though a catheter could be introduced, I clearly saw that unless some more efficient and direct method of urine drainage was provided, he would speedily sink. Under these circumstances, I tapped the bladder from the perineum through the large prostate with the instrument I had prepared for this special purpose, and which I will now show you. The operation of tapping the bladder when distended from this position is one that is not attended with any difficulty. The point of puncture is one inch in front of the anus, and the direction in a line toward the umbilicus. The trocar is so devised that urine escapes from the handle of the instrument immediately the interior of the bladder is reached. In the instance now under notice, the patient was at once relieved, and in twenty-four hours he was up, sitting in an easy-chair—an important matter with old people. I will not trouble you with the details of this extremely interesting case as they have already been published in full (*"Surgical Disorders of the Urinary Organs."* Third edition. By Reginald Harrison). For about six weeks after the bladder was tapped, the patient passed urine entirely through the prostatic canula, and he was able to go about as if nothing ailed him, by means of a tube apparatus specially adapted for this purpose. Then it was noted that urine, in gradually increasing quantities, began to flow through the natural passage, indicating that the prostate was ceasing to obstruct. The canula was removed six weeks after the operation, the wound completely closed in the course of a few days, and the patient entirely recovered. He died at the age of 90 without any recurrence of his prostatic troubles. What was most interesting to observe in this case was the prostatic atrophy that seemed to follow the operation. I examined this patient two years after the operation, and could find no evidence that the prostate was enlarged. I have had on two occasions to repeat the operation, with results entirely corresponding with the case I have related more

at length. I have not yet been able to collect the evidence in reference to the shrinking of the prostate which has followed this procedure, but my own observations in reference to this particular point have been corroborated by others. Mr. Weston, of Stafford, has kindly given me the particulars of a case of a very similar nature, where, after the operation, a very considerable diminution in the size of the prostate was observed.

But though this method of proceeding was especially applicable to those extremely rare cases of retention of urine due to a large prostate, where it was thought that no catheter could be introduced, it seemed to me that there were others which would be more advantageously dealt with by an opening from the perineum, which would allow of digital exploration of the enlargement followed by drainage. This procedure formed the subject of a communication I made before the International Medical Congress at Copenhagen in 1884. It consists in puncturing the membranous urethra on a grooved staff in the median line of the perineum sufficient to permit the introduction of the index finger within the prostatic urethra, to this extent resembling Cock's operation. Having thus obtained access to the interior of the bladder by a very limited incision, I have dealt with the prostate in three different ways. (1) By a division of the floor of the prostate as a preliminary to the insertion of a drainage-tube. (2) By the enucleation or removal of some portion of the prostatic mass before putting in the tube. (3) By the insertion of the drainage-tube alone. I have now operated in these ways on something like thirty-five cases of advanced prostatic obstruction, excluding malignant growths, in males over 60 years of age, for reasons such as I have stated, where catheterism proved insufficient to give adequate relief. In eighteen of these cases, either the floor of the prostate was divided, or a portion of the enlarged prostate removed before the drainage-tube was introduced, while in the remainder the perineum was opened merely for the introduction of the tube. I should like to say a few words about these operations, which have now ranged over somewhere about seven years, and the points that I would speak to on this occasion are these: (1) The risk of operations of this kind. (2) The present or subsequent condition of the persons, as far as I know, who have been thus treated. (3)

The effects that may have been observed on the enlarged prostate. Of the deaths, I only know of three, one a week after the operation, and another four weeks, and the third two months afterward. In these instances the patients, judging from the condition of the kidneys and ureters from previous back-pressure, lived longer and more comfortable than they would otherwise have done. One man, aged 68, died over six months afterward from a paralytic seizure. During this illness it was not found necessary to use a catheter for him. Two persons died over twelve months after the operation, from causes that I have not been able to ascertain, but as in this interval they had been well and active, they can hardly be included in the list of mortality. What, I would ask, would the mortality have been, had all these cases been left to endure the troubles that attend constant catheterism under difficulties? Of the remaining twenty-nine persons, something is or has been known of nineteen of them, at intervals of time over twelve months after the operation. Three of these have a permanent opening in the position of the wound. Two of these catheterize themselves in this way, and report themselves as perfectly well. The third had, in addition to an obstructing prostate, a tight urethral stricture, and now micturates at natural intervals through the perineum without the aid of the catheter. Of the sixteen whose artificial openings have soundly closed, ten are quite independent of the use of the catheter, three of them being extremely feeble by reason of advanced years. Of the remaining six, four have to use the catheter as before the operation, but do so without difficulty, or without causing hemorrhage. The two remaining cases have in addition had temporary difficulty in catheterism. In one of these the obstacle seems to have been due to the impaction of a calculus from which he has occasionally suffered for some years. Of the remaining ten, of whose condition nothing is known or can be ascertained, four are believed to have left England altogether.

And now I come to the third question which a retrospect of these cases suggests, namely, Have any effects on the large prostate been observed? I have already stated that shrinking of the enlarged prostate has been known to follow when the bladder has been tapped through it, and the canula retained for some time. I am equally certain, and have pointed

it out to others, that I have seen the same shrinkage occur where the urethra has been opened, and a tube introduced for the purpose of drainage without any damage being inflicted by section, puncture, or otherwise on the prostate. This has been more or less evident in the majority of the 19 cases previously referred to, in some to a very marked degree. Hence one is less surprised at finding the marked and permanent benefit in micturition which some of the cases referred to undoubtedly presented. This observation has led me to inquire as to the precise circumstance connected with this class of operations on the enlarged prostate which seemed to have been coincident with this extremely important change. The facts appear to point to the inference that where the bladder is drained incontinently for some weeks, I speak of from three to six weeks, an enlarged prostate will undergo a palpable degree of shrinkage, and I make this statement on the ground that where the drainage has been thus prolonged the urine will be found to force its way in spite of the tube along the natural passage. I have noticed this on so many occasions that when it happens I take it as a sign that the tube may be removed. That it has proved a correct signal I have not the least doubt, as healing of the wound has rapidly followed. Further than this evidence was also afforded me on several instances that the diminution in size was apparent to the finger from the rectum. If, as I have ventured to suggest, hypertrophy of the prostate is directly associated with the large amount of muscular element that enters into its composition, it is not surprising that the induction of a state of complete physiological rest should be followed by the result I have noted. However this may be, the fact remains unaltered.

Before referring to the details connected with my method of operating and illustrating it, I should like to briefly refer to the practice of supra-pubic prostatectomy which has been recently introduced by Mr. McGill, of Leeds. Taking advantage of the improvements which have been so warmly advocated by Sir Henry Thompson and others in regard to this way of opening the bladder for stone and other tumors, Mr. McGill has utilized it for the purpose of removing more or less of the hypertrophied prostate. At the Leeds meeting of the British Medical Association last year, several patients were exhibited, who certainly derived great and I believe permanent

benefit from the operation. When, however, the subjects and the circumstances of supra-pubic prostatectomy are taken into consideration, I do not think that it is an operation which is likely to be very extensively employed. In hale elderly persons where the evidence is very conclusive that a prostatic mass is projecting into the bladder and irritating it, we may occasionally avail ourselves of it with advantage. With the old, feeble, and broken-down, who oftener than otherwise furnish the victims of advanced forms of prostatic obstruction, we must be content with measures which, while affording immediate and complete relief, entail far less strain on the reduced powers of repair of the individual than is implied by a supra-pubic removal of more or less of the prostate. For this reason especially, in addition to others, I am inclined to limit the operative procedure to the opening and draining of the bladder from the perineum as affording a mode of relief which, so far as I have observed it, is unattended with risk and is capable of giving not only immediate but permanent relief.

And now I will refer to the details connected with my operation. The patient being placed in the lithotomy position, a staff with a median groove is passed into the bladder. There may be extreme difficulty, from spasm chiefly, in introducing this or any other instrument up to the time the anæsthetic is administered, but when this is done I have always found the obstacle at once disappear. The staff being held in position, the perineum is punctured with a knife one inch in front of the anus, sufficient to enable the index finger of the left hand to be placed on the groove in the staff. No dissection is at all necessary or desirable. If the perineum is very deep I sometimes clear the staff at the bottom of the puncture with a blunt knife I had made for this purpose. The groove having been bared, the small gorget is made to slide along it into the bladder, the handle of the staff being drawn toward the operator to facilitate this movement. Then the finger can be passed within the prostatic urethra. If the latter is felt to be tolerably clear, the tube may be at once introduced into the bladder. If the condition of the prostate is such as to offer any obstacle to the passage of the finger or the tube I then introduce a curved probe-pointed knife fairly within the bladder and divide the floor of the prostate directly downward. This is best done from within outward. In three instances I

have also removed more or less pendulous portions of the growth. The stiff tube is then introduced and retained usually from seven to ten days, then a soft tube is substituted. For the latter purpose I have employed a contrivance suggested by Mr. Annandale, which enables the patient to get up and go about, as shown in the figure (Fig. 2). The soft tube which is tucked into the waist belt is connected with the perineal tube, so that when the patient desires to pass water all he has to do is to let down the former, and turn a tap which is attached to it. Drainage has thus been carried out in the instances I have already referred to from ten days to six weeks. When it is found that in spite of the tube the urine forces itself, as it will do, along the whole length of the ure-

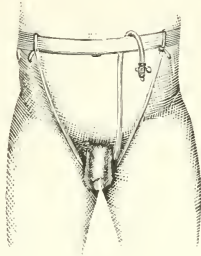


FIG. 2.

thra, this is a signal that the drainage may be discontinued and the opening allowed to close. The time the tube should otherwise be retained depends of course on the conditions that each case presents. So long as the urine remains alkaline and offensive so long must it be utilized, not only for drainage but as the most convenient way for washing out the bladder. For the latter purpose I find in the first instance a solution of boracic acid, a drachm to a pint of tepid water, most serviceable. If under the use of this the urine does not become normal I usually substitute the neutral sulphate of quinine in the proportion of two grains to the ounce of water. Creolin has recently been used for a similar purpose, but I have not yet tried it sufficiently often as to be able to speak to its virtues. I will conclude this lecture with the narration of one of my earliest and also one of my most recent cases.

The first was a man, æt. 73, in February, 1884, when he first came under my notice. For some months he had had to practise catheterism for an enlarged prostate with a considerable amount of residual urine. After a time there was increased difficulty connected with the introduction of the catheter, and serious hemorrhage frequently took place. His desire to urinate and his strainings were incessant, and nothing, after three weeks' trial with various kinds of instruments, appeared to give him any relief. In February, 1884, he underwent perineal prostatotomy, and wore one of my tubes continuously for seven weeks. The wound closed within a few days after drainage was discontinued. I saw him at intervals for two years after the operation. He remained quite well, and never had occasion to resort to the catheter again. On several occasions I passed an instrument for him, and could find no obstruction in the prostatic urethra, nor did his residual urine exceed a few drachms. This man was rapidly sinking under the irritation, caused by the constant use of the catheter, and there was no doubt in my mind that his improvement was due to the drainage that was practised.

The most recent case was that of a man, æt. 75, whom I saw in consultation with Mr. Woodforde, and who subsequently was admitted into St. Peter's Hospital for treatment. The history and particulars of the case were as follows: He had had retention of urine and frequency in micturition for eighteen months. For the past six months the desire to urinate had been constant, and was practically unrelievable by the catheter. When I first saw him he was using the instrument every hour both by day and night, the urine being most offensive, and loaded with pus and mucus. As various means for washing out the bladder had been tried, I suggested his being admitted into hospital. Shortly after his admission into St. Peter's I introduced a grooved staff and opened the perineum for the purpose of putting a drainage-tube into the bladder, as I have already described. The tube was worn for a week in spite of a good deal of prostatic spasm, when he was able to return to his home. The stiff tube was then replaced by the softer apparatus. Unusual difficulty was experienced in wearing the latter in consequence of the severe spasms that occurred. In time, however, this subsided, the condition of the urine improved and the wound speedily healed on the re-

moval of the tube. In spite of the difficulty connected with the retention of the drainage-tube, the only instance where in my practice this has occurred, the man's condition is now (six months after the operation) as follows: In the daytime he can get about and follow his employment without having to use a catheter. During the night he passes his catheter twice, and sometimes thrice, as he considers that it is an advantage to him, though I have no doubt he could dispense with it. On each occasion I have examined it his urine has been normal. There can be no doubt that though the circumstances connected with the operation were not as favorable for success as I could have wished, this patient's condition since the operation is a greatly, and, I believe, a permanently improved one.

CHAPTER III.

POINTS IN THE THERAPEUTICS AND HYGIENE OF THE BLADDER.

As in other directions, I shall hope to show that progress has been made, not only in reference to the more strictly operative measures connected with the urinary organs, but also in all that relates to the therapeutics and hygiene of this class of affections.

In comparing the various systems of which the human body is built up, such for instance as the nervous, respiratory, circulatory, digestive, and urinary, in addition to others that might be mentioned, it appears to me that the urinary more especially enjoys a condition for the action of drugs upon it which is not equally shared by the other contributing systems, except perhaps by the digestive. For, as I shall presently have to demonstrate to you, not perhaps chemically, but at all events clinically, we apparently derive much of our force relative to drug action on the urinary apparatus by the direct control of certain agencies which it is the special province of the kidneys to eliminate, in addition to those general effects upon the body as a whole which the particular drug in question has the power of exercising.

The physiological action of drugs on the urinary apparatus in its general and special application is far too large a subject for me to approach on an occasion such as this, even if my limited knowledge of it as a practical surgeon permitted me under any circumstances to undertake a discussion of this kind. I must therefore limit myself to one aspect of the question with the view of pointing out certain properties of normal urine relative to the tissues with which it comes in contact, the effects which are thus produced and how the latter may be modified for surgical purposes.

That normal urine possesses by the decomposition of its urea the power of acute tissue destruction is evidenced by those cases of extravasation of urine which most frequently

occur in connection with injuries to the urinary organs, and the advanced forms of organic stricture. Here may be seen the rapid conversion of the whole area, which comes in contact with urine so effused, into a mortifying mass. This was so well illustrated in a case of an extremely rare nature which recently came under my notice that I will give you the particulars of it.

It was that of a boy, æt. 14, whom I saw in consultation a few weeks ago. His history was as follows: He had suffered for years from an irritable bladder, and pain following urination, but nothing appears to have been done for him, his parents not wishing an examination to be made. Four days before I saw him, when playing with some friends in the garden, he fell heavily on his perineum astride over some palings, and then on to his side. This was followed by swelling of the supra-pubic region, extending to the penis and scrotum. There was no discharge of blood at the time of the accident from the urethra, nor was retention of urine complete. When I saw him four days afterward the supra-pubic region and the skin of the penis were gangrenous, and the scrotum distended. The perineum was flat and not œdematous as is usually seen when rupture of the deep urethra from injury occurs. I could not pass a catheter simply for the reason that the glans penis was entirely concealed by a large œdematous and sloughing prepuce. As it was quite clear that extravasation of urine had occurred under somewhat unusual circumstances, the patient was put under chloroform. I then proceeded to deal with the different points where relief was obviously required to let urine and disorganized tissue escape, this consisted in making the incision as for supra-pubic cystotomy, incising on either side the raphe the distended scrotum, and splitting up the sloughing prepuce along the dorsum of the penis where the tension was greatest. This enabled me to discover the glans penis, and to introduce a silver catheter into the bladder. This at once led to the detection of a stone which seemed to be held within the prostatic urethra. Though not provided with instruments for lithotomy, I thought the stone should be removed at once. I therefore cut down in the median line on the silver catheter, and opened the urethra in the membranous portion. This enabled me to feel the stone with my index finger, though as soon as I touched it, it fell back into the

bladder; however, with an ordinary pair of dressing forceps, and my finger in the rectum, I succeeded in extracting a pointed stone of a torpedo shape, weighing nearly three drachms. It was composed of light-colored uric acid with a coating of phosphates, and is represented in the figure (Fig. 3).

From the examination I made of the parts I have not the slightest doubt the stone penetrated the bladder immediately behind and below the pubes at a point corresponding with what is commonly called the neck of the bladder. This permitted urine to be effused into the space known as the *porta vesica* of Retzius, and occasioned all the disastrous effects I have mentioned. The free drainage which the lithotomy wound provided was an important factor in the progress of the case. Though there was considerable sloughing of the prepuce and skin of the penis, scrotum, and supra-pubic region,

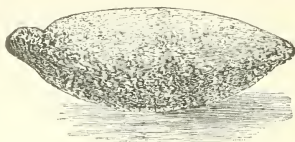


FIG. 3.

the patient made a rapid recovery. The case is unique, so far as my experience goes, for though instances have come under my notice where calculi have made their way through the perineum by a slow process of inflammation and suppuration, I am not aware of an instance where the bladder has been suddenly ruptured by a stone it contained in the way I have described.

Cases, such as these, however, may not only be used for illustrating the acutely destructive properties of urine, but as indicating how completely Nature provides for all the contingencies of life. What could only happen to a man who was unfortunate enough to rupture his urethra when removed from surgical aid unless the urine contained within itself a property for effecting its own escape? I am now seeing a patient for a perineal fistula whose life was undoubtedly saved in this way. He was travelling in the bush last year in South Africa, and had the misfortune to rupture his urethra by his horse falling when he was hundreds of miles away from proper

medical assistance. Acute suppuration in the perineum and sloughing of the scrotum followed, but in spite of this he recovered. He is now under treatment for three fistulae through which the whole of the urine was discharged for many months during a process of convalescence under most unfavorable conditions. Still, the acute sloughing which followed the accident, and for which the urine was responsible, undoubtedly saved the life of the patient.

But though we have evidence in cases such as these of the destruction certain elements of the urine are capable of bringing about, we have further proof, if this were required, in instances where the urine by reason of its altered character is incapable of undergoing that chemical change which is necessary for acute tissue destruction.

I recorded a case ("Lectures on Urinary Disorders," third edition, p. 46) which came under my notice some years ago, where a middle-aged man who was being attended for Bright's disease suddenly developed what was supposed to be an œdema of the scrotum. The case proved to be one of urethral stricture, complicating Bright's disease, and causing acute scrotal extravasation of urine. But though the swelling had been in existence for twenty-four hours before I saw him, it seemed curious that no signs of inflammation and gangrene appeared imminent. However, as the tension was considerable, I incised the parts involved in the extravasation. As the fluid escaped from the incisions I noticed that it had not the ammoniacal odor which is always so perceptible in such instances. I was somewhat puzzled for an explanation how it was that extravasated urine failed to cause signs of gangrene. I subsequently collected some of the urine as it trickled through the wounds, and compared it with some drawn off from the bladder by the catheter. I found them identical, and chemical analysis proved that in both there was an almost complete absence of urea, the specific gravity of the urine being as low as 1004. This, then, to my mind solved the mystery, and explained that as there was no urea to decompose there was no source for the production of the ammonia by which the destruction of tissues in connection with extravasated normal urine is effected. By the absence of urea the urine was rendered chemically harmless to the tissues with which it came in contact.

Passing, however, from instances of acute tissue poisoning,

I shall have no difficulty in showing you that the same fluid is capable of being placed under circumstances where certain general septic effects may in various degrees be developed. If any one who is interested in this subject will take the trouble to turn to the records of internal urethrotomy as practised only a few years ago they will find in the rigors, fever, and occasional deaths that followed this operation, the most unmistakable evidence that experiment is capable of affording, of some forms of urine poisoning which seemed to be associated with certain conditions under which the urine was placed by the nature of the operation that was practised. I was so much impressed with this at the time that it led me to alter my practice materially in reference to an operation which, on other grounds, had much to commend it.

In 1885 I published ("Brit. Med. Journ.," July 18th, 1885) a series of cases, where in some extremely bad cases of stricture unfitted for any other kind of treatment, I performed internal urethrotomy, and at the same time provided for thorough urine drainage by a puncture in the perineum, through which a tube was passed. Time will not permit me to enter into this subject as fully as I could wish, but putting aside collateral evidence and advantages connected with the proceeding advanced, I established the facts (1) that the rigors and fever following operations on the urethra were entirely septic, and (2) that they could be avoided by providing for more perfect urine drainage. But though it may not be possible or expedient to construct all wounds on such principles as to secure healing without the risk of decomposition and absorption of some of the element of the process, which is the essence of antiseptic surgery, the practice of Lister has demonstrated how much may be artificially done by the employment of antiseptics to secure this end. If the urine, as I have demonstrated, can be placed relatively to a wound under conditions such as to make its absorption poisonous to the system at large, it has, on the other hand been proved possible to so influence it artificially as to render such a contingency extremely improbable.

And this stage of the argument leads me to lay stress on what has been spoken of as the sterilization of the urine by artificial expedients. Modern therapeutics have undoubtedly shown that some drugs can so influence normal urine as to

cause it to behave very differently from what it would otherwise do when brought into contact with certain kinds of wounds. The power of quinine in connection with operations on the urinary organs has long been recognized, and there can be but little doubt that this is directly associated with the fact that it is so largely eliminated by the urine. Still more striking is the testimony of Dr. Palmer, of Louisville, U. S. A., who found that he could so sterilize the urine by the administration of boracic acid in ten-grain doses as to prevent the occurrence of urethral fever after such operations on the urethra as internal urethrotomy. My own experience in connection with the latter operation corroborates this, for after the use of antiseptics, principally through the medium of the urine, I have enjoyed an immunity from septic fever attacks after operations on the urinary passages which compares most favorably with what was previously observed. Nor am I disposed to think that the power of sterilizing the urine so as to render it innocuous when placed under conditions where otherwise it would be liable to generate septic influences is limited to quinine and boracic acid. Further investigations will no doubt show that many other principles are capable of exercising somewhat similar powers. For instance I have frequently been struck with the action of hyposulphite of soda in half-drachm doses in some purulent affections of the urinary organs, and I have but little doubt that this is due to the direct influence of the drug as a bactericide in the way that I have endeavored to lay stress upon.

Passing, however, from the acuter forms of local and general urine poisoning, I will proceed to notice others belonging to the same category. It is now some years ago since Sir Andrew Clark drew attention to certain febrile symptoms occasionally following catheterism, to which the term catheter fever has been applied. In the general discussion which followed the publication of these observations, it appeared to me that insufficient prominence was given to the fact that residual urine is an absolute necessity to some bladders, and that if an attempt is made to do without it something worse is provided—that is to say, septic urine is substituted for aseptic. In a number of observations I made in reference to this point, I found that in certain cases of enlarged prostate, where the bladder was not generally atonic, the removal of acid residual

urine was followed by the rapid conversion of subsequent excretions into a more or less ammoniacal compound loaded with bacteria. It was under such circumstances that catheter fever was seen, and I cannot find any evidence that it has ever been met with where the urine was proved to be normal.

In the course of the inquiries to which I have just referred, I found from repeated examinations that it was not difficult to explain how urine thus became acutely septic. Where a bladder has been accustomed, we will say, to contain three or four ounces of urine, the sudden withdrawal of the latter establishes a condition of flaccidity of the vesical walls which is favorable to the admission of air either by the instrument or the urethra; in the next place, there is an excessive exudation of mucus from the prostate and adjacent parts; and lastly, sanguineous pouring out takes place from the vesical vessels which are thus suddenly deprived of their support. In this way material for decomposition is amply provided. So satisfied am I that the physical condition of the suddenly and completely emptied bladder has everything to do with the setting up of so-called catheter fever—a term which must be regarded as merely expressive of what other cavities and spaces in the body are capable of producing whenever their contents are in any way analogous—that I consider very special precautions should be taken in the first instance, whenever residual urine has to be artificially and systematically removed, with the view of preventing the aseptic conditions to which I have referred being provided. What surgeon does not recognize the necessity of doing so where a chest or a psoas abscess has to be tapped with the view of averting what might, with equal force, be called a trocar fever? Where the urine is acid to commence with, it should be removed by instalments; and where alkaline or unhealthy, it should be replaced by some antiseptic fluid, the quantity of which may from time to time be reduced. There is no better antiseptic for the bladder than healthy urine; there is no more dangerous one than when the latter is made to undergo active decomposition.

In failing to recognize a septic cause for the fever which occasionally accompanies catheterism, and referring it to some occult morbid condition of the nervous system, I cannot help observing that the same kind of explanation was advanced up to a few years ago as explaining the rigors and fever follow-

ing the use of instruments for urethral stricture, until I demonstrated by a series of operations (Lettsomian Lectures, 1888) that these phenomena were due to the absorption of some products of the urine, probably of the nature of alkaloids. On this being recognized and provided against, as it now is in most operations on the urethra, the occurrence of such complications, often attended with considerable risk, has been largely diminished, if not entirely prevented, in the practice of most surgeons.

Having briefly reminded you of certain local and general poisonous effects that normal urine is capable of producing, and how these effects may to a large extent be prevented or provided against, I will proceed to notice certain drugs which seem to me to exercise, probably in the mode in which they are eliminated, a beneficial effect on some of the disorders connected with the urinary apparatus. In the present day, when we are overwhelmed with the number of new drugs coming under notice, one is rather disposed to speak with reservation on such a subject. Still, on the other hand, there can be no doubt that the field of therapeutics is steadily extending, and that valuable additions are from time to time being made. Early in 1886 my attention was first called to the use of pichi (*Fabiana imbricata*) in connection with some diseases of the urinary tract. The case in point was that of a gentleman who had long suffered from attacks of renal colic and hamaturia. On several occasions he had passed uric acid stones of considerable size after much pain, and once I had to crush a calculus for him which was too large to escape along the urethra. While travelling in Bolivia that year he was seized with a similar attack, and was treated entirely by means of an infusion of pichi, which he seems to have drunk *ad libitum*. He got through this attack very much better than previous ones—a fact which he attributed to the new medicine. He brought me home some specimens of the raw material such as you see on the table.

For the last four years I have been using this drug in the form of an infusion and fluid extract, in drachm doses of the latter, pretty extensively both in private and hospital practice, with, I believe, considerable benefit. I have found it useful in many instances of the following: 1. In renal colic and the passing of calculi through the kidneys and along the ure-

ters, attended with hæmaturia: though not exercising any solvent power it seems by its action on the tissues in some way to favor the escape of the stone, and thus to suppress the bleeding. 2. In the hemorrhage which frequently accompanies cancer of the bladder. In the case of a medical man who was recently under my observation it certainly gave more relief than anything else that was tried, as I have also noted in other instances. Lastly, the sedative action of the drug on the mucous membrane of the bladder has proved beneficial in many instances of irritability connected with a large prostate. After the bladder has been properly cleansed by irrigation and disinfected, it has been frequently found that the calls to urinate were far less urgent when the pichi was being used.

Acting somewhat similarly though less astringent in its properties, and therefore of less value when there is hemorrhage, I have found an extract prepared from the berries of fruit of the saw palmetto (*Serenoa serrulata*) very serviceable. Writing in reference to his own case, a surgeon in America says: "I do not know whether you have used the saw palmetto in cases of prostate trouble. I have used it several times with apparent advantage." It is stated to be a plant of the palm tribe, which is indigenous to the coast of Florida. It appears in the first instance to have been used medicinally as a demulcent in connection with irritative disorders of the respiratory mucous membrane. It is also stated to possess fat producing properties in the case of animals that feed upon its fruit. Messrs. Bell and Co., of Oxford Street, have prepared me a fluid extract from the berries, which, in doses of half a drachm to a drachm in water, has proved of service in cases of irritable bladder. It seems to act something like pareira, and is a good substitute for it.

Of the chemical products which I have tried in this class of disorders, I would mention saccharin in half-grain doses. Attention was first drawn to it by Dr. Little ("Dublin Journal," June, 1888) as being useful in preventing ammoniacal change in urine in cases of cystitis. Where the mucous membrane of the bladder throws off large quantities of mucus and the urine undergoes rapid ammoniacal decomposition, I have on several occasions noted that the latter becomes healthy and acid under the use of saccharin. On discontinuing the drug I have also observed that the urine will speedily return to its

original condition. Hence it may be found useful in readily providing against conditions which cannot be radically altered. Dr. Thomas Stephenson and Dr. Woolridge ("Pharmaceutical Journal," December 1st, 1888) have shown that saccharin may be taken for a considerable period without interfering with the digestive or other functions of the body.

Before closing the chapter I will show you a preparation which was first made for me some years ago by Clay and Abraham, of Liverpool, which I have now used rather extensively. It is described as the borocitrate of magnesia. My attention was first called to it by a paper by Dr. Kochler, of Kosten ("Berlin klin. Wochen.," November 3d, 1879), who advocated its employment in cases of uric acid calculi and gravel. It is prepared by dissolving a natural borate of magnesia which is found at Strassfurt in citric acid. It forms a white powder with a sourish taste, and is given in teaspoonful doses in a tumbler of warm water two or three times a day. I have tried it in several cases of impacted renal calculi, which have come to this hospital with the view of having the stone removed by operation. Here are two specimens of stone which have been passed by two patients within the last few days who had been taking the boracite for some weeks previously for attacks of renal colic and hemorrhage. One of the stones, you will see, presents a slightly worm-eaten appearance as if it had been exposed to some solvent action by which its loosening and ultimate escape had been facilitated. I do not pretend to offer any reasons based on the chemistry of the subject for what I am showing you, all I can say is that I have frequently known the discharge of these bodies, whose presence had previously been suspected, to take place after the use of the salt. It may be all it does is to secure that the individual shall take at stated times more fluid than perhaps he would otherwise do: an important point upon which Sir William Roberts has laid stress. I am, however, disposed to think, from what I have seen, that it does more than thus induce a person to flush his kidneys with a bland fluid by no means disagreeable to take, but that it is capable of modifying or altering the crystalline form in which uric acid is discharged and of exercising a solvent power on some kinds of urate stones.

CHAPTER IV.

HÆMATURIA : ITS SIGNIFICANCE AND SURGICAL TREATMENT.

I HAD intended to bring under your notice to-day some points connected with the selection of catheters and other instruments used in the treatment of urinary diseases; I find, however, I have already said a good deal upon this subject, and that what remains to be added may be incidentally introduced with other material. I, therefore, propose speaking to you about hæmaturia in more special reference to its surgical significance. In order that I might provide myself with a text, and so approach a very wide and important subject with some degree of system and concentration, and at the same time with a direct bearing upon practice, I have carefully gone over my note-books containing the records of my private practice, and selected the last hundred cases of true hæmaturia that have come under my observation. Apart from my notes most of these cases, being comparatively recent, are within my recollection, and in regard to a considerable proportion I can speak from a more continuous knowledge of them than I could do of a similar number of hospital or public patients. For it must be noted that cases of hæmaturia often run over very considerable periods of time without seriously injuring or inconveniencing the individuals who suffer in this way. I have taken the cases just in the order they have come under my notice, only rejecting those where the bleeding from the urinary passages occurred under circumstances which cannot be said to have anything but a very limited significance. I refer to such cases as those where blood is mixed with the urine as a consequence of the use of catheters and other instruments, and in connection with gonorrhœa, and the use, or rather abuse of injections; these I have excluded from my list.

In the hundred case I have thus taken I will put in the

order of their frequency the causes which in my belief have produced this symptom or are responsible directly for its continuance:

Kidney stones, ...	30
The hypertrophied prostate of elderly males, ...	20
Bladder stones, ...	14
Tumors of bladder and prostate—mostly malignant, ...	13
Urinary tuberculosis, ...	6
Stricture of the urethra, ...	5
Cystitis not due to a senile prostate, ...	3
The passing of crystals from the kidney downward, ...	3
Traumatisms or their effects, ...	2
<i>Filaria sanguinis hominis</i> , ...	1
Of very doubtful origin, ...	3
	100

I am not at all sure whether, in this country at all events, the order of frequency which I believe occurred in my practice does not represent tolerably accurately the general experience in reference to this one symptom. I say this country, because local conditions may have a largely determining influence. For instance, if statistics on a large scale were taken in certain parts of the East, as in Egypt, it would be found that the hæmaturia due to a parasite largely predominates. In certain districts of England as well as in the practice of some medical men, the hæmaturia due to stone and gravel might be even much in excess of that which I have put it at, but taken as a whole the proportions I have given will, I think, be found fairly representative.

Hæmaturia may be regarded as a tolerably constant symptom of stone in the kidney, and is, I believe, more to be relied on for diagnosis than any other. It is not, however, invariably present. In the case of a man from whom I removed two stones from the kidney a few months ago with success, this symptom was absent, the indication for the operation being the acute paroxysms of lumbar and testicular pain from which he suffered. The persistence of hæmaturia associated with symptoms of renal colic is sufficient to warrant the exploration of the suspected organ by an incision in the loins. I have practised the lumbar incision as elsewhere described ("Notes

on the Surgery of the Kidney," "Liverpool Medico-Chirurgical Journal," January, 1889) and have every reason to be satisfied with it.

In the thirty cases of hæmaturia due to impacted renal stone which I have tabulated, there were several where the escape of the calculus followed the use of boracite as described in the previous lecture, and with this the cessation of the hemorrhage.

It may not be out of place to point out here that the descent of a calculus from the kidney may be favored sometimes by the distention of the bladder with water and its regurgitation along the ureters. I have endeavored to show in a paper on the subject ("The Lancet," March 10th, 1888) how this may be done, and how very little it sometimes takes to favor the dislodgment of a stone from the kidney which may have been a source of hemorrhage and pain for some time.

Stone in the bladder was attended with bleeding in fourteen instances. Hæmaturia is not as a rule a constant symptom of this affection, though the circumstances under which it occurs are generally very significant. When you hear of a person with an irritable bladder who cannot, for instance, take horse exercise, ride on an omnibus, or walk along a rough road without seeing blood in his urine, you may take it as a good hint that he may have a stone in the bladder. At all events, in the absence of other indications it is generally worth acting upon and suggesting that a sound should be passed, and the bladder explored. Then an acute attack of hæmaturia, followed by irritability of the bladder, may sometimes indicate that though a stone has passed down from the kidney it has not escaped by the urethra. This happened in two instances out of the fourteen I have tabulated. In both cases a single crush with the lithotrite effected the immediate discharge of the fragments with no further inconvenience to the patient.

If, after patients have suffered from undoubted signs of renal colic, and no stone is known to have been passed, they could be induced to have the bladder explored, and, if necessary, a lithotrite introduced, the mortality after stone operations would be practically *nil*.

In three instances out of my hundred, the passing of crystals chiefly uric acid, was apparently responsible for the ap-

pearance of blood in the urine. In none of these cases was the amount of blood considerable. Some persons seem never to be well unless they are passing large quantities of uric acid, and everything which tends to check the excretion appears to add to their discomfort. I believe the hemorrhage that attends these discharges of uric acid is connected with the precise nature of the crystalline form, as a change in the shape of the crystal is often followed by a cessation of this symptom. It is under these circumstances, and with this object that the waters of the Vosges, such as Contrexeville and Vittel often prove of so much service. The youngest patient of the three coming under this category was a female child, a few months old, whose urine contained a large number of uric crystals which seemed to be the cause of the bleeding. The patient was fed on equal quantities of milk, barley, and Contrexeville water, under which the symptoms disappeared. *Apropos* of hæmaturia caused by crystals, I would refer to a correspondence ("The Lancet," July 5th, 1890) relating to the presence of blood in the urine after eating cooked rhubarb. I have known this happen on several occasions, especially where the drinking water is hard, as pointed out by Dr. O'Neill, crystals of oxalate of lime being found in the urine in abundance. I have also seen the most profuse hæmaturia occur after an excessive indulgence in asparagus.

Senile enlargement of the prostate appeared to be responsible for twenty cases of hæmaturia out of the number. In the majority of instances the amount of bleeding was not large, but it would recur from time to time on very slight causes, such as cold and fatigue. There are a good many persons with large prostates who get temporary attacks of bleeding much on the same principle as others do who suffer from piles. Dr. Frank reminded me the other day that the term "prostatic pile" was a condition recognized by some German writers on this subject. I fully appreciate the force of the expression. When the bladder is capable of emptying itself tolerably well this symptom is merely a temporary one and usually disappears with some restrictions in diet and a little active purgation. There is, however, one condition of the senile bladder which adds considerably to the trouble connected with this kind of bleeding. I refer to those instances where it occurs with a large prostate and an atonic, or almost com-

pletely atonic, bladder. The great safeguard against prostatic hemorrhage is the power of the bladder to exercise pressure. In two instances not only had I to empty the bladder of blood, but to keep it empty by pressure upon it, and the retention of a catheter until the tendency to bleed had ceased, just as is done with the flaccid uterus. In both the instances I refer to this was successfully accomplished, and the patients recovered, though the loss of blood was considerable. It is not the least use depending upon hæmostatics in cases such as these, the mechanical reason why the bleeding will not cease must be recognized and acted upon, or the patients will flood to death with their bladders distended with blood up to the umbilicus, as I have seen.

For the purpose of emptying the bladder under such circumstances there is nothing like one of the catheters and aspirators which are employed in evacuating the fragments of stone after lithotrity. Unless this is effectually done, there is very little chance of restraining the hemorrhage.

Malignant tumors of the bladder or the prostate accounted for thirteen cases of hæmaturia. If the disease is in the prostate, you can generally make it out with the finger in the rectum; if this is not the case, then you may have this very significant fact, that though from its nature the blood evidently comes from the interior of the bladder, you have no senile prostate to account for it; the patient may be, and often is, considerably under the hypertrophic age. Then there is another helpful point in connection with the diagnosis of malignant tumors of the bladder, they are as a rule more comfortable when bleeding moderately than when the urine is absolutely clear. This is a point I have often noticed in cases which have been verified, either by operation or post-mortem examination. It is also curious to notice how slow some malignant growths of the bladder and prostate proceed: there may be repeated attacks of hemorrhage, but I have known such cases as epithelioma of the bladder go on for four and six years, and really occasion but little inconvenience until the bleeding becomes profuse and unrestrainable, and the question will then naturally arise, What is to be done when the hemorrhage from such a growth becomes excessive? My belief is that when this stage arrives, in the majority of cases the best thing to be done is to open the bladder above the

pubes. I can hardly recall an instance when, by this expedient, a patient did not obtain a temporary respite from bleeding, and the consequences that follow it. Even if the wound never closes again the patient can be kept in a far greater state of comfort than when he only has his urethra to depend upon. In the female the ready way in which the growth can be got at and removed is a strong reason for early exploration, and, if necessary, removal.

Hæmaturia is almost as constant an indication that tubercle has invaded the kidneys or ureters as hæmoptysis signifies that the lungs are tubercular. Urinary tuberculosis may be either ascending or descending. It is always a good plan in tubercular subjects or in persons who are suffering from ill-defined slight attacks of hæmaturia, and possessing tubercular histories, not to neglect to make a careful examination of the testes, the prostate and the vesiculæ seminales, with the finger. The detection of tubercular deposit in any of these positions, under these circumstances, will often throw the necessary light upon the hæmaturia. The shotty feel of the prostate when impregnated with the early form of this deposit is important to know how to recognize. In the breaking-down stages of urinary tubercle, the presence of pus as well as blood, not to say anything of the bacillus, adds considerably to the ease of making a diagnosis.

Stricture of the urethra is accredited as the cause of five cases of hæmaturia. It is not as a rule the stricture that bleeds, but the bladder from the atony that ensues by reason of the viscus being very imperfectly emptied. In two instances the strictures were extremely tight, and it seemed impossible how the cause of the bleeding could have been overlooked. In every instance where the stricture had been sufficiently dilated and the bladder had regained its tone, the blood disappeared from the urine.

It is curious to notice how some persons with really tight strictures, by the use of greater expulsion force mitigate considerably the inconvenience the contraction would otherwise cause. It is not always easy to remember this in practice. There is a patient attending the out-patient department to whose symptoms I have often directed attention. He came here complaining of loss of power over the bladder and lower extremities, from the loins downward. There was diminished

sensation and the reflexes were unnatural, and it was clear from his gait that he was suffering from an early stage of paraplegia. On examining his urethra I found that he had a moderately tight stricture in the membranous portion, and as there was no other cause for the condition of his limbs I regarded it as one of reflected paralysis, and commenced to dilate his stricture. Under this treatment, it was observed that movement and sensation in the affected parts gradually returned and in three months all symptoms of paralysis had disappeared, the patient being able to walk several miles without fatigue. I have met with two or three instances of this kind. I am induced to refer to them here as illustrating how a stricture may not only escape notice, but produce remote symptoms which, at first sight, would hardly suggest such a cause. In like manner a persistent hæmaturia may be dependent upon a contraction in the urethra and continue until the latter is removed.

Wounds involving the kidney may in some remote way or other cause blood to find its way into the urine and become mixed with it. Let me mention two examples: In May, 1888, I saw a patient in consultation with Dr. Glynn who was suffering from purulent urine. Six weeks before I saw him he had a very free attack of hæmaturia which lasted for some days. He had no symptoms of renal colic, but complained of a dull aching pain in the region of the left kidney. His history was as follows: Five months previously when at sea he was shot by his steward in two places, one ball passing through his thigh, and the other entering his left side two inches in front of the posterior superior spinous process of the ilium. He was leaning over his assailant who was on the ground at the time the bullets were fired. He was confined to bed for some time and has since suffered from urinary irritation and purulent urine. There appeared to be an increased area of dulness below the left kidney, and the part was sensitive to the touch. The bladder was sounded, but I could detect nothing abnormal. I have no doubt the bullet is imbedded in the left kidney, from which place I proposed to remove it, but as the man was returning home to America, and was in fairly good health, he declined to submit to any operation at present. The other case of traumatic hæmaturia followed the escape of a pin by the urethra which had been

swallowed by a gentleman, 56 years of age, four months before it was voided.

Three cases of hæmaturia were associated with cystitis which had occurred in males independent of a large prostate or gonorrhœa. In one the cystitis followed an injury to the abdomen where probably the bleeding was due to some slight laceration. In the other two instances it seemed to be connected with the violence of the inflammation, one of the patients being an extremely gouty subject with highly acid urine.

My list contains one illustration of bleeding due to the *filaria sanguinis hominis*. The presence of this parasite in the urinary system explains cases which were formerly described under the name of chylous urine. In referring to this parasite, Sir William Roberts ("On Urinary and Renal Diseases," 4th edition) says: "Its local effects are supposed to depend on the formation of aggregations of filaria which block up the capillaries and cause by their active movements irritation and rupture of the blood channels and lymphatics, and thus lead to the appearance of chyle and blood in the urine." In the case to which I am now referring, the urine was at one time quite chylous in appearance, while at others it was deeply colored with blood and contained large clots. The presence of the parasite was in this instance detected both in the blood and urine by Sir William Roberts and Dr. Stephen Mackenzie, who were kind enough to see the patient. The administration of iodide of potassium in 20-grain doses, as first suggested by Dr. Harley, seemed to be followed by good results.

The list closes with three cases where the origin of the bleeding seemed so obscure that I did not even like to venture an opinion, which could not be supported either by reason or experience, as to its probable origin. In many of the instances where there was a doubt as to the nature of the bleeding and in others where further confirmation seemed desirable, the electric cystoscope was used. As an adjunct to other means for diagnosis I can testify to the value of this instrument. On several occasions I have gladly availed myself of the kind assistance of my colleague, Mr. Hurry Fenwick, whose recent work on this subject has contributed so much toward establishing the utility of electricity as an illuminant for surgical purposes.

CHAPTER V.

THE EARLY DETECTION AND TREATMENT OF STONE IN THE BLADDER.

THE risk attending the removal of a stone from the bladder may be roughly estimated by the size the stone has been allowed to attain. Hence I have selected as a useful subject for our consideration to-day certain points connected with the early diagnosis and treatment of this affection.

I need hardly remind you that when a stone assumes such dimensions, or is of a shape where it cannot be expelled along the urethra by the natural efforts of the bladder, its removal must be effected either by a crushing or a cutting operation. Up to within a comparatively recent date the various operations included under the term lithotomy were almost universally employed, the crushing operation being confined to the least dangerous forms of the disorder, and in a sense restricted to the practice of a comparatively few. During recent years all this has been greatly changed, lithotrity is now the rule at all events in adults, the cutting operation being reserved for exceptional conditions either of the stone or the parts involved. When we consider the small risk that now attends the operation of lithotrity it is impossible not to feel in every case where a stone has to be removed from the bladder by the use of the knife, that there was a time in its history when such a proceeding would have been quite unnecessary. In the present day the rejection of lithotrity in a given case implies one, at least, of two things, (1) either that the stone has been allowed to grow too big to admit of its removal in this way, or that (2) by its long continued presence the stone has so altered the structural arrangement of the parts in its immediate vicinity as to render the ultimate success of the crushing operation highly improbable.

Before proceeding to notice some mechanical details connected with the detection of stone, I would remind you for

reasons that will be obvious that the primary formation of stone in adults and children is very different. In the former I believe, as a rule, vesical stones are extensions on appreciable nuclei which have descended from the kidneys, while in the latter they are from the commencement aggregations formed in the bladder. This is an important distinction which often works out in the following way. In children it is almost impossible to form an approximate idea as to when a stone began to form in the bladder, whereas in adults the process can often be distinctly connected with a marked attack of renal colic, hæmaturia, or nephralgia. This is especially noticeable in those cases where urates or oxalates form the nucleus or centre of the stone, as when the calculus is phosphatic throughout, it not infrequently happens that there is present some special reason why the bladder should be entirely responsible. In the case of many stones I have thus not only been able to fix the probable date when they entered the bladder, but to form an estimate of the rate at which they have grown. Hence, as I have said in a previous lecture, persons who pass stones from the kidneys would do well if there is any doubt, to take steps for ascertaining that the stone has left the bladder and is not remaining there to grow and to make its subsequent removal a proceeding in which an element of risk is introduced.

If I were asked to briefly enumerate the indications for sounding the adult male bladder, I should put them down in the following order: for continuing irritability of the bladder unexplainable or insufficiently so, by the presence of a large prostate: for the recurrence of blood in the urine, particularly after brisk or jolting exercise, and for the frequent intervention of bladder spasm, either with or without the habitual use of the catheter, where the prostate is known to be enlarged. These conditions will be found to indicate more frequently than any other the presence of a stone in the bladder. Pain or irritation felt at the end of the penis is of more value as a symptom of stone in children than in adults, as with the latter a large prostate rendered sensitive by the condition of the urine passing over it is quite sufficient to account for this symptom. For instance, nervous persons in the habit of passing highly phosphatic urine usually have tender prostates, and often complain of pain at the end of the penis. I have known

such individuals to be frequently sounded for stone or tumor on that account.

For sounding purposes nearly every surgeon has his favorite implement which generally bears his own name. An inspection of a variety of sounds would seem to indicate that the hand has more to do with the process than the exact shape and make of the instrument. Sounds should not be so large as to fit the urethra too tightly, otherwise much of the delicacy of the touch will be lost. Where the prostate is very large the surgeon should be provided with a sound two or three inches longer than those usually made, otherwise he may fail to easily reach all parts of the bladder, unless the penis is inconveniently telescoped. When the bladder is much distorted in shape you can feel a stone with a soft bougie when a steel sound cannot be made, without force, to touch it. For such a purpose I have sometimes found a flexible instrument with a metal tip extremely useful. As Dr. Freyer has pointed out, the aspirator and catheter employed for the removal of fragments of stone after lithotritry make a capital sound by causing stones, often of small size, which might otherwise escape notice to rattle against the eye of the instrument. I have employed this device for the removal of certain kinds of foreign bodies from the bladder, and thus avoided resorting to less delicate forms of searching and extracting instruments. Here is a fine pig's bristle, slightly coated with phosphates, which was detected and removed by the apparatus just referred to. In this instance the patient had first passed up into his bladder a piece of bacon rind with the view, I presume, of lubricating the urethra, the bristle being subsequently introduced. Symptoms of bladder irritation coming on, I sounded with an evacuating catheter and rubber syringe such as I am now showing you, with the result mentioned. The case is fully reported elsewhere ("*The Lancet*," October 29th, 1887) with remarks on this subject.

It must not be forgotten that, however delicate your touch and however well devised your sounds may be, there are some kinds of stone which you do not feel until you have them in the jaws of the lithotrite. This has happened to me twice recently; so far as the sounding went, and with a strong suspicion in my mind that a stone was present in each instance, I could not detect one until I had passed a lithotrite, and had

actually got the calculus within the grasp of the instrument. Here is the specimen from one of these cases. Some phosphatic stones are covered over with a thick slimy sort of tenacious mucus which effectually muffles the sensation and sound that contact between a steel body and a stone would otherwise give. Large stones which are located behind and above the pubes, are sometimes missed by the curved sound passing directly under them. When you are sounding, a lithotrite should always be at hand, not merely for measuring the stone when detected, but for gently feeling about with. As a rule it is better to sound a person under an anæsthetic; in this way pain is entirely avoided, and the examination is rendered far more searching and complete.

Apart, however, from the question of size, it is most important that a stone should be detected before it leads to certain structural changes in the bladder itself. Five years ago ("Annals of Surgery," June, 1885) I described some forms of calculi in the bladder under the name of fixed or stationary stones, implying that without being encysted they occupied certain positions, most commonly above the enlarged prostate, from which they seldom moved except by accident. In connection with this point one cannot go over a fairly long list of lithotrity cases without here and there recognizing one where bladder symptoms only became urgent and continuous after the stone had been completely and properly crushed and evacuated. Let me illustrate what I mean. A patient about sixty years of age, consulted me some years ago for occasional hæmaturia. Behind an hypertrophied prostate I found a large urate stone which I subsequently removed by lithotrity. After some weeks of complete relief, he again began to complain of irritability of the bladder, and in addition the discharge of ammoniacal urine indicating that which he had never previously suffered from, namely, chronic cystitis. This continued for some time, when on sounding him again I found the place of the original stone occupied by a considerable mass of triple phosphates which I also removed by crushing. The same thing occurred about a year afterward. The first stone that formed no doubt represented a constitutional tendency, while the latter ones seemed to me to be connected with certain changes in the shape and structure of the bladder wall, which had been brought about by the long-continued presence of the

one that had preceded them. The effects produced on the bladder itself by the retention of a stone for some considerable time with special reference to the recurrence of calculus, is a subject worthy of careful consideration, as insufficient attention has hitherto been paid to it.

That the earlier detection of stone which now prevails, coupled with Bigelow's method of operating, has contributed largely to the reduced mortality connected with the affection, there can I think be no doubt. Any one who is at all acquainted with the subject will recognize as a fact that the risks attendant upon the retention of a small stone in the bladder, are really far greater than those which its removal by lithotripsy now entail. For, apart from its influence on the structure of the bladder and the irritation it creates, the presence of a calculus may not only prove to be a constant source of bleeding, but may actually lead to the rupture of the bladder, as I have shown in a previous lecture.

Further, as bearing upon the importance of dealing with stones while they are within the reach of lithotripsy as now practised, we may point to our greatly lessened period of convalescence as compared with that which prevailed before Bigelow's discovery. Looking back at my notes of cases which occurred before and after this period, and comparing them stone for stone, the period of convalescence has diminished by less than one-half. It is not at all uncommon to see stones which formerly would have occupied two or three operations, or sittings as they were called, extending at intervals over a month or so, now disposed of at one crushing, recovery taking place within a week or even less. This not only means a considerable diminution in the amount of direct risk which repeated crushings necessarily entail, but in those connected with whatever tends to protract a convalescence. I do not think I am wrong in stating that Bigelow's method has reduced the period of recovery after lithotripsy, taking all sizes of stone together, by something like one-half the time. No better illustration of this point could be taken than the last case I operated upon at this hospital, at which several of you were present. The patient, a male, 50 years of age, was operated upon on July 2d, and was discharged well on the sixth day afterward. The stone was a urate one coated with phosphates, and had a diameter of an inch and a quarter. Though the

operation occupied nearly half an hour the water in the wash-bottle used for removing the fragments, was noticed to be hardly discolored with blood, and the day following the operation the urine was perfectly clear and normal in appearance. There are a few details I would lay stress upon which may be of service to those who are commencing to practice lithotrixy.

1. To suspend all manipulations with the sound or lithotrite, or in washing out the fragments, when the bladder is on the move. Patients even when profoundly under an anæsthetic with the reflexes in abeyance, will sometimes commence to force and squeeze with their bladders in a most remarkable manner. The pressure of this may be roughly measured by the distance fluid is projected from the catheter even by some bladders which were supposed to be atonied or paralyzed. All movements on the part of the operator should be at once suspended till this is over. I have known three instances at least where rupture of the bladder occurred from disregard of this precaution, two where the lithotrite was being used, and one where the wash-bottle was in action. It is very easy to rupture a bladder when it is on the strain, whereas such an accident is most unlikely to happen where the organ is quiescent.

2. Conduct all your manipulations so as not, if possible, to cause bleeding. Some operators will hardly discolor the water in the wash-bottle even where the manipulations are prolonged.

3. Before the operation is completed remove all clots from the bladder and wash out with warm water until there is evidence that any bleeding which may have been caused by the manipulations has practically ceased.

4. Ascertain before the patient recovers consciousness what kind and size of catheter passes easiest. On the use of this instrument in the after-management of the patient much depends. If urine mixed with blood is retained and allowed to undergo putrefaction some degree of septic fever is sure to occur. As a rule, after each time the catheter is used two or three ounces of warm boracic lotion in the proportion of a drachm to a pint should be thrown into the bladder by means of a rubber bottle and allowed to escape. This should be continued until the urine is voided, either with or without the use of the catheter, of acid reaction and free from blood staining.

Passing from by far the larger class of cases which are now treated by lithotripsy, and from urging the importance of endeavoring, by an early diagnosis, to bring all cases within this category, I will proceed to notice those instances where lithotripsy seems to be indicated.

Stones in male children; very large stones in male adults, where the weight may be estimated at several ounces, and some smaller-sized recurrent stones complicated with sacculated, or bladders requiring drainage, but otherwise quite within the limits of lithotripsy, may be generally stated as better adapted for lithotomy in some form. So far as male children are concerned, some surgeons will probably join issue with me. The large experience of Drs. Keegan and Freyer and other operators in India more particularly, as well as the smaller experience of some surgeons in this country and elsewhere, would seem to indicate that a skilled lithotritist may obtain most excellent results in even the youngest subjects from crushing. A short time ago my colleague, Mr. Heycock, crushed a hard stone weighing nearly an ounce and the boy was well and about within a week. But what about practitioners who are not skilled in lithotripsy and yet have large experience generally in operative surgery? I feel under these circumstances that lithotomy as a rule will prove to be, as it always has been, the wiser selection.

In choosing the kind of lithotomy I must express my preference both in boys and adults for the lateral method, unless I want to remove a stone which from its size is not likely to come out very easily through the perineum, or if I wish to look into the bladder with the naked eye for the purpose of searching for a sacculus in which a stone may be lodged, and at the same time dealing with it. To the latter category, where the suprapubic operation is indicated, Mr. Mayo Robson (*"British Medical Journal,"* March 9th, 1889) has added illustrations where not only has a stone been thus removed from the bladder, but a portion of the large prostate extirpated.

When prolonged drainage of the bladder is necessary in certain cases of chronic cystitis complicated with stone, or in some instances of recurring phosphatic stone, where the posterior wall of the bladder is much dependent, and a division of the floor of the prostate is required, I feel sure that the perineal route is to be preferred. I have seen successful instances

of this where drainage had previously been practised and maintained for some time by a suprapubic opening.

In comparing the suprapubic and lateral operations there can be no doubt that the former proceeding will recommend itself to many practitioners on the ground that it is the simpler of the two, and if for this reason it is the more efficiently executed, no better ground can be advanced for its selection, provided that the same end can be obtained. When I have chosen the suprapubic operation no attempt has been made to secure the primary healing of the wound, and so far as sutures are concerned, they have only been used for approximating a limited portion of the superficial wound. I then put in a large rubber drainage-tube, which is passed through a covering made by a wood-wool pad. The tube is retained for two or three days and then removed, the patient being kept absolutely dry by the constant use of the wood-wool pads, which have been found to be the simplest and most efficient mode of dressing. By using any dressing which does not absorb, infiltration of urine into the cellular tissue in front of the neck of the bladder may readily occur and retard the progress of the case.

Though lithotomy and lithotrity are as a rule employed to meet quite different conditions, I would like to remind you that they may be combined for some special reason with the happiest results. Here are the fragments of a large stone I removed two years ago by the operation known as perineal lithotrity. It practically consists in the making of an external urethrotomy sufficient to introduce the index finger, by means of which the parts constituting the neck of the bladder are dilated. Then a pair of crushing forceps, either straight or curved, as the case may be, are passed in, by means of which the stone or stones are rapidly crushed, so as to admit of their evacuation, partly by the forceps and partly by the aspirator. In this way I got rid of a large phosphatic stone, the fragments of which weighed nearly three ounces, in something under five minutes, a process which I do not think could have been as safely and as certainly accomplished under half an hour by the ordinary lithotrite and evacuator. The patient, a young man of eighteen years of age, was up and well with the wound soundly healed on the eleventh day. The crushing and extracting forceps which have been made for me

by Messrs. Krohne and Sesemann are shown in the figure (Fig. 4).

There are cases of stone, chiefly recurring ones, where not only is a digital examination of the bladder necessary, but where after the removal of the stone the bladder may with

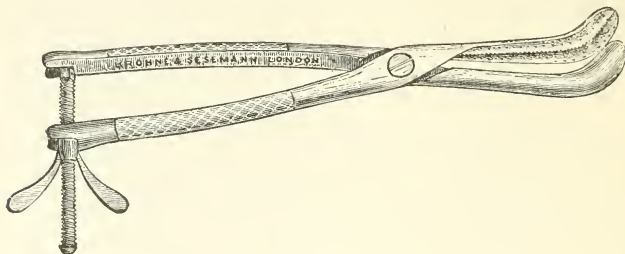


FIG. 4.

much advantage be submitted to a process of drainage with the view of preventing further relapse. In such instances I have availed myself of perineal lithotrity, the nearer approach to the bladder which the puncture permits of proving an important feature in promoting the success that has followed the adoption of this combination with practically no additional risk.

CHAPTER VI.

SOME MISCELLANEOUS POINTS.

IN the first place I should like to say a few words in reference to the pathology of gleet, inasmuch as this extremely common affection is not only difficult to cure, but frequently proves the starting-point for much more serious conditions. Upon the pathology of gleet considerable light has been recently thrown by Oberlaender, by means of the electric endoscope, and various effects of persistent inflammation on the mucous tract have been pointed out. In the earlier stages of gleet, observation with the endoscope shows that the process practically consists in more or less acute epithelial desquamation, at points in the deep urethra where the affection is usually situated. In this way the slight amount of discharge which may be said to constitute the disease is supplied. Though there is generally some tumefaction about the affected spots, no stricture can then be said to exist, and treatment is still capable of bringing about a complete restoration of the parts without the subsequent introduction of any contractile tissue. And this brings me to consider the next stage in the process which eventually leads to the formation of an organized stricture. The function exercised by the epithelial coat of the urethra, and the consequences that may ensue when it becomes deranged by persistent inflammation, formed the subject for some observations in my Lettsomian Lectures before the Medical Society of London, in 1888. The view that I then advocated was, that by chronic inflammation, such as we see in gleet, the epithelial coat becomes so damaged at one or more spots as to lose its power of rendering the urethra urine-tight, and that a slow process of exudation through the mucous coat ensues. As a consequence of this, and to prevent urine soaking further into the tissues, inflammatory lymph-exudation in the submucous area is excited, and barriers of lymph which eventually become organized are thrown out opposite the

places where the leakages have taken place. The contraction of these submucous lymph barriers, I urged, completed the process of stricture formation. This view as to the pathology of stricture is supported by the following considerations: (1) That though the mucous membrane is the tissue chiefly concerned in the primary inflammation, it is as a rule only secondarily implicated in the stricture-forming process. In many instances it will be found after death that the dimensions of the mucous membrane are not permanently altered, and that it is possible to split a stricture without necessarily rupturing the lining membrane of the canal; and (2) the great variety in form and shape in which stricture tissue is deposited in relation with the urethra. I have known as many as a dozen irregular points of contraction in the urethra of a man, which were believed to be formed in the way I have described, consequent upon a very chronic gleet.

Though the views I have thus given expression to recognize the existence of varying degrees of tumefaction or swelling within the urethral walls at one or more spots in the initial stage of the stricture-forming process, I cannot admit the propriety of proceeding to the performance of internal urethrotomy for their removal, even though, as I have no doubt, they are capable of being demonstrated as obstacles to micturition by such instruments of precision as Otis' urethrometer. My experience, derived from the observation of cases of this kind which had been submitted by various surgeons, to internal section, is certainly not favorable to this method, however well adapted it may be to some advanced forms of cicatricial stricture. Some of the worst cases of stricture in the deep urethra that have come under my notice have been those where an internal urethrotomy had been performed during the early or gleet stage of the affection. In the pendulous urethra such ill effects following the operation have not been so frequently noticed.

In urging these opinions as explaining the mode in which stricture tissue is commonly deposited, I must not be regarded as failing to recognize that large class of strictures which are the result of wounds in the urethra. Here the healing process goes on with the wound exposed to the irritating influence of contact with pent-up urine, and the result is the formation of a cicatrix of the densest and most contractile description. That a dense contractile stricture is by no means a necessary

consequence of a torn or lacerated urethra, I have demonstrated by a series of cases where such injuries had been treated by perineal section and urine drainage, without leaving behind any trace of the original injury. Many of these cases have been watched for periods of time extending over two years.

In giving expression to these views as to the pathology of gleet and the healing of wounds of the urethra, it is for the purpose of emphasizing the importance of thorough irrigation in connection with the prevention and treatment of urethral stricture. I have long felt that the difficulty in this class of affections lies, not in the want of suitable medications, but in our imperfect means of using them. It is astonishing what perfect donching with cold water or some mild astringent will do in some cases where individuals are driven into the depths of despair by some small amount of urethral discharge, which frequently is no more hurtful than are the slight chronic excretions which proceed from other parts of the body that might be mentioned. The first apparatus I described for this purpose consisted of a Higginson's syringe, fitted with a smaller rubber catheter, by which a running stream of water could be maintained from any point in the deep urethra, outward ("On the Prevention of Stricture and Prostatic Obstruction." Churchill, 1881). More recently I have adopted for the same purpose as giving a more equable stream, a simple siphon apparatus, which was first made by Mr. Reynolds, of Liverpool, on the principle of Thudichum's nasal douche. It is principally in the treatment of gleet that I have found this instrument of most value. As a rule, the reservoir is filled with about six ounces of a solution of sulpho-carbolate of zinc, two grains to the ounce, with which the patient irrigates his urethra for some minutes once or twice a day. By compressing the meatus around the pipe of the irrigator the outflow is temporarily stopped, and the fluid is forced by hydrostatic pressure into the various lacunæ of the urethra, which, in chronic cases particularly, are more or less centres of infection. This thorough mode of irrigation is almost impossible to be obtained with an ordinary glass syringe, as the latter is often only worked at a great disadvantage, as I have had the means of demonstrating in a very simple manner. Alum, zinc, borax, acetate of lead, or Condyl's fluid, may in some in-

stances be substituted for the sulpho-carbolate of zinc, but the latter has proved to be the most reliable. Now this simple, but not I believe sufficiently well-known means of douching the urethra, is capable of extension to other conditions than that mentioned, where it is necessary to bring the canal under direct medication. There are other discharges—prostatic, seminal, and mucous—which are often maintained by an unhealthy state of the urethra; for such of these as require local treatment, I have found it in the irrigator, rather than in the employment of those powerful and dangerous cauterizations, which at one time were advocated by Lallemand and others. In cases of orchitis, where the infection has proceeded from the urethra, as in gonorrhœa, I have found deep urethral irrigation with a solution of perchloride of mercury (1 in 10,000), most effective in shortening and moderating the attack.

Passing from this reference to the use of the douche in various urethral discharges, I would allude to it further as an important adjunct in the treatment of stricture by dilatation. After every dilatation, when the calibre of the stricture will permit the entrance of the fine point of the irrigator, I have the urethra well douched with warm water, commencing from the point immediately behind the obstruction. This is continued for a few minutes, and has a most beneficial effect, not only in thoroughly cleansing the canal, but in assisting, by hydrostatic pressure on the contracted parts, the process of dilatation. Strictures which have been treated in this way, have not only yielded to dilatation more rapidly, but what is of still more importance, they have, as might be expected, shown less tendency to contract, and have been more amenable to the subsequent use of the bougie. It is my habit to instruct patients to employ it themselves, as a necessary part of the treatment by dilatation.

A word may be said in reference to the use of the douche in connection with the treatment of the less complicated forms of urethral fistulæ. There is hardly anything which causes more annoyance to a patient otherwise sound, than the constant dribbling of small quantities of urine along a sinus opening in the perineum, or by the side of the scrotum, which has resulted either from a peri-urethral abscess, or from some simple surgical procedure connected with the urethra. The two great obstacles to sound healing from the bottom of the fistula

are (1) the persistence of some degree of stricture or contraction of the urethra in front of the communication with the false passage, and (2) an unclean, and therefore septic condition of the internal aperture caused by the lodgment of urine within the urethra after each act of micturition. When the stricture has been sufficiently dilated I have frequently succeeded in getting these sinuses to heal quickly and soundly, by making the patient irrigate his urethra with some suitable antiseptic three or four times in the course of the twenty-four hours.

And now I will draw attention to a few instruments I brought under notice some years ago (the "*Lancet*," February 3d, 1883), which I believe are by far the best and safest bougies we can employ in most cases of tight stricture. They are popularly known as "whips," being the name given to them by my friend Mr. Lund, in his Hunterian Lectures. They are made in different sizes, in lengths of about twenty inches, commencing by a filiform point, and gradually increasing toward the other extremity. In speaking of the value of these instruments, in the treatment of tight strictures especially, I am sure that a trial by those unacquainted with them will insure their adoption in that class of strictures where the difficulties of instrumentation are the greatest. In my own hands they have had an extended trial, and when I have demonstrated their employment to others, their adoption has generally followed. It is no small recommendation to say of an instrument of this kind, that it rarely fails to pass a stricture, so long as it is structurally pervious, however fine the passage may be; that dilatation necessarily follows upon this without risking the reintroduction of a bougie on a larger scale; and that these advantages can be secured without the liability to laceration and hemorrhage which often accompany the use of other instruments. This is important to remember, as every degree of laceration the urethra receives adds to that kind of tissue of which an organic tissue consists. Further, by reason of the tapering form of this bougie, every introduction of it not only stretches the stricture, and increases its calibre by several sizes of the French gauge, but it tends to make the entrance to the stricture from the front funnelled shape, and thus adds to the ease with which subsequent introductions are effected, either by the patient or the

.

practitioner. Patients find these instruments, after they have been taught their use by the surgeon, far more easy to introduce than any other, and as they cause little or no friction in making their way through the obstruction, the process of dilatation proceeds more rapidly than is the case when more abrupt bougies are used. It is better to soften new whips, by immersing them for a few seconds in warm water, so that they may curl up in the bladder without the patient being conscious of it, as is the case with the pilot bougies which are now so generally appended to many urethral instruments. By the use of this form of instrument, it is quite practicable, by the introduction of two or three larger ones, to bring up at once a very contracted stricture, until it will admit with ease a good-sized bougie or catheter. I believe that we cannot proceed too rapidly with this process. To relieve a patient with retention of urine by means of a fine catheter, perhaps tied in with the chance of it slipping out, is to leave him in a very sorry plight. A person who is going about dribbling, with a stricture of small calibre, is in constant danger of his life, as there is no knowing when sudden retention, perineal abscess, or extravasation of urine may supervene. Some melancholy illustrations of this must occur to every one who has seen much of urethral stricture. Mr. Robson ("Provincial Medical Journal," Vol. VIII., 1889) has recently illustrated the value of immediate dilatation with bougies, and in the commencement of this process I have found the whip invaluable.

In reference to the selection of instruments generally, I much prefer the flexible ones; they are readily introduced, and rarely cause hemorrhage. Those made of silk web have some advantage over the rubber catheter, as they can be used with a little more firmness. It is curious to observe the difference in the curves of the prostatic urethra; hence in one case a coudé slips in easiest, in another an olive-pointed instrument, while in a third an ordinary round-headed catheter glides in without trouble. It is important that the delivery power of a catheter should be relative to the normal size of the urethra, and not greatly in excess. What can be worse for a person who has been accustomed for some years to ooze or dribble his urine, than to have it suddenly drawn off *pleno vivo* in about half the usual time the normal act occupies? I have often found the too rapid emptying of the bladder in the

regular employment of catheterism an important factor in producing loss of natural expulsive power, and in retarding its return when it has been temporarily suspended. Nature will not provide muscle when it is not wanted. Here, then, we have at least two important reasons why the selection of catheters should not be handed over to the instrument maker alone, as a patient may very innocently do himself harm by means of a catheter unsuited to his case.

Whatever means or form of instrument, whether flexible or not, our individual experience prompts us to use in endeavoring to overcome the obstacles that some strictures present, should they prove ineffectual, I believe supra-pubic aspiration is the best and safest expedient of a temporary nature that can be employed. By means of this we can always depend on being able to empty a distended bladder with a very small amount of risk, and less, I believe, than what may in some instances attend difficult catheterism.

In reference to aspiration in connection with some urinary disorders, I believe that it occasionally offers the best and safest way of commencing what is now called the catheter life under certain circumstances. I will take a case to illustrate what I mean: A short time ago, a gentleman approaching seventy years of age, consulted me in reference to his prostate. Apparently he was in excellent health, but he was going about with a bladder full of urine which reached almost up to his umbilicus. He had never used a catheter, as he could evacuate three or four ounces of urine at a time, which he did at intervals of three or four hours. His prostate was enlarged, the urine was faintly acid, and frequently neutral, and had a specific gravity of 1004-6. Now it appeared to me that with a helpless bladder of this kind, and with kidneys working under so great disadvantage it would be extremely easy to induce that condition of septicæmia which Sir Andrew Clark has so graphically illustrated. On the other hand to leave him alone with this distention, though he was quite unconscious of it, was to him at that stage of affairs almost equally suicidal. Under these circumstances I determined to deal with the distended bladder by supra-pubic aspiration, and not to touch the urethra with the catheter. To commence with, I drew off four ounces of urine above the pubes with a fine aspirator needle. I aspirated nine times in a fortnight,

and by gradually increasing the quantity of urine removed, brought down the bladder to almost normal dimensions. Elastic pressure over the abdomen was at the same time exercised by a suitable bandage. The patient suffered in no respect whatever, and he continued to void naturally the amount of urine I have already mentioned. It was interesting to notice that as the pressure was removed from the urinary apparatus, the acid reaction became more pronounced, and the specific gravity rose to 1015 where it remained; under these altered conditions, I no longer hesitated to use the catheter daily, which the patient continued to do for himself with advantage and comfort. I thus avoided during the period of greatest risk in this case, when the urine was on the verge of alkalinity, and the kidneys hardly doing anything else than percolate water, any chance of introducing an important element of decomposition into the bladder or interfering with a urethra which had been distorted by prostatic hypertrophy. With acid urine and a fair specific gravity, with ordinary care there is comparatively little risk attendant the use of catheters, where these conditions are absent the danger with elderly males is by no means an imaginary one; in removing urine either by catheter or the aspirator from the atonic bladder, I feel sure that the employment of abdominal support in the shape of a binder or an elastic bandage is of much advantage. In connection with these remarks on the treatment of some forms of the atonic bladder by aspiration, instead of in the first instance by any attempt to introduce a catheter, I had noted the impunity with which the proceeding had been practised in those instances, where it had followed futile trials to pass a catheter by reason of a large prostate. It seemed rarer to find that fever followed this mode of removing urine from the paralyzed bladder, though many instances are recorded where it was resorted to for several consecutive days.

Cases of impassable urethral stricture are becoming rarer every day, and this means that a vast improvement has taken place within the last few years in the construction and design of instruments for this purpose. To suppose that one kind of catheter or bougie will answer every purpose, is to suppose that which if not at variance with common sense, is at all events opposed to any practical acquaintance with the pathological anatomy of urethral obstructions.

If after that degree of temporizing which supra-pubic aspiration gives in cases of impassable stricture, failure to enter *per viam naturalem* still continues, then I believe Wheelhouse's ingenious proceeding of entering the bladder from the perineum by the urethra is the one that commends itself to our attention. It is safe, and presents no difficulties which a surgeon need fear facing.

I should like to add a word as to the great value of cocaine as a local application in connection with a variety of small operations on the urethra, such as the passing of catheters and bougies, the stretching and dilating of strictures, and the management of various forms of prostatic obstruction where mechanical treatment is a necessity. With a very little trouble and delay, by the injection of a few drops of a 10-per-cent solution of cocaine by means of a suitable instrument, say, for instance, on the face of a contractile stricture, the operation of entering and passing through it with a bougie is in most persons rendered as nearly painless as it is possible. In this way persons will submit to treatment who would otherwise shrink by reason of the horror with which all pain or disagreeable sensation in this part is regarded. I have largely employed it under these circumstances, and am induced to refer to it here because I think its use not sufficiently appreciated in connection with what I would speak of as the minor operations on these parts. To attempt to crush large stones with it, or to use it where the operation occupies some time, is merely to bring a useful drug into discredit.

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